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## **FOREWORD**

Presented number of Silesian University of Technology. Scientific Papers. Organization and Management Series. Presented papers contain result of researches conducted by various universities. The number consists of 40 papers.

The papers presented in the number concentrate on many topics connected with organization and management. There are in the number papers about learning organization, production management, quality management, healthcare management, safety management, crisis management, lean management, innovative management, changes management, human resource management, energy management, tourism management, knowledge management, the usage of AI in management, intellectual capital and service management.

*Bożena Skotnicka-Zasadzień  
Radosław Wolniak*





## LEARNING ASPECTS OF ORGANISING REMOTE WORK IN THE CONTEXT OF GENERATION Z

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**Purpose:** The aim of this paper is to present the most important factors shaping the opinions of Generation Z representatives regarding remote work, based on a factor analysis carried out using the conducted research.

**Design/methodology/approach:** The research results presented in this paper are part of a quantitative survey entitled: 'Managerial aspects of managing remote working', conducted among young people working remotely, representing Generation Z, conducted in December 2022. The survey used quantitative research methods utilizing Computer Assisted Telephone Interview and Computer-Assisted Web Interview. Based on the findings of the studies conducted on a group of employees representing Generation Z, the Exploratory factor analysis (EFA) technique was applied to organize the factors with the highest relevance for the respondents in online work.

**Findings:** The analysed group of young and very young people, contrary to the stereotypical perception, appreciates the importance of knowledge of other employees and not only that "stored" in organisational knowledge repositories. In the context of improving their performance and learning, they appreciate the importance of personal relationships.

**Research limitations/implications:** To dwell upon the underlying causes of this situation, it should be recommended to proceed with further in-depth qualitative research.

**Practical implications:** What the research communicates to the organization is that although Generation Z members are aware of the significance of knowledge flow and learning processes, and they understand the role of peer relations in these processes, they are unable to overcome the social barriers created by the online working system due to lack of appropriate skills.

**Originality/value:** The results of the research revealed different from the stereotypical perception of remote work among young employees.

**Keywords:** Generation Z, remote work, learning processes, EFA.

**Category of the paper:** Research paper.

## 1. Introduction

Recent years of scientific research relating to work management seem to have been dominated by discussions concerning the massive entry into the labour market of Generation Z and the consequences of that phenomenon at the managerial level as well as the growing importance of remote work being the implication of the COVID-19 pandemic. Both phenomena bring benefits and challenges to work organisation processes. Numerous publications question the validity and correctness of grouping employees by age category and question definitions of the term generation (Urick et al., 2017). Concerning the issue under study, different authors quote various classifications of generational divisions (Twenge, 2024; Goh, Lee, 2018; Kirchmayer, Fratricova, 2018). The publication by Wiktorowicz et al. (2016), which objectively presents sociological, psychological, anthropological and even cultural perceptions of the term generation, considers the ultimate adoption of an approach in the light of which generation is not only a category determined by the date of birth but also understood as a community of experiences shaped by a specific society. The most popular division assumes that Generation Z, in relation to Poland, includes people born after 1995, although researchers sometimes consider those born in 1990 as its representatives (Wiktorowicz et al., 2016; Sobierajski, Kuszewska, 2023), others include only those born in 2000 and later (Dreyer, Stojanová, 2022). The literature on the subject indicates a high attachment, or even dependence, of the representatives of that generation on modern information technologies and the tools used to operate them. For Generation Z, smartphones and iPhones are basic communication tools, much more important than face-to-face communication (Astorquiza-Bustos, Quintero-Peña, 2023; Bamieh, Ziegler, 2022). Through them, young employees interact, learn, acquire and share knowledge. It therefore seems that remote work, as a form based on IT solutions, will be the preferred form of employment. Indeed, the years of the pandemic and the short period after its cessation have produced research showing that remote work not only contributed to the satisfaction of young workers but was also more efficient than stationary work (Emanuel, Harrington, 2020). Many young people find remote work so desirable that they are willing to accept a lower remuneration for it (Emanuel, Harrington, 2023b).

The questions therefore arise: How do the representatives of the youngest generation in the labour market cope with remote work? What is their opinion about it? What dimensions of it are most important to them? The research results concerning Generation Z indicate, e.g., problems related to the exchange of knowledge understood as learning and teaching others (Sekala et al., 2023). It is related to the fact that for Generation Z, knowledge is sometimes identified with the category of information (Szymkowiak et al., 2021). Additionally, there are clear competence gaps in the field of social and communication skills necessary to determine and express knowledge, which is hidden knowledge and the employee is often unaware of its existence (Hegade, Shettar, 2022; Steyn et al., 2020). How, then, to implement learning

processes in remote work conditions for young employees in the case of whom the first professional experience is continuous development based on learning?

Literature studies on remote work indicate that there is a great terminological diversity concerning that issue. In Poland, in the light of the legal basis in force, until recently there was a distinction between the terms telework and remote work (Krzyżanowska, 2020). That distinction disappeared in 2023, when statutory solutions ended the discussion on that form of work while regulating the most important organisational and legal issues. In the light of legal provisions (Journal of Laws of 2023, item 240), the main element characterising remote is the "workplace". This can be any place designated by the employee (including the place of residence), provided that it is agreed upon with the employer in each case.

Research points to the numerous benefits of remote work, both for the employee and the employer. There is a particular emphasis on the importance of remote work in shaping employee well-being (Charalampous, 2020), which seems particularly important to Generation Z significantly focused on comfort in the workplace. In turn, the facts that remote work makes it difficult for managers to supervise the work of the team (Wąsik, 2020), complicates the issues of regulating work safety, makes it hard to properly secure data and worsens internal communication in the company (Wąsik, 2020) are indicated as the main disadvantages of remote work. Considering the perspective of the discussed issue and the study group, it is of great importance that remote work causes a decrease in commitment and trust among employees (Tomaszuk, Wasiluk, 2023), deterioration of work quality and a sense of isolation (Bartel et al., 2012). The same applies to the difficulty of assessing employee effectiveness and productivity when it comes to remote work (Tsang et al., 2023b; Morikawa, 2023).

The aim of this paper is to present the most important factors shaping the opinions of Generation Z representatives regarding remote work, based on a factor analysis carried out using the conducted research.

## **2. Research Methodology**

The research results presented in this paper are part of a quantitative survey entitled: 'Managerial aspects of managing remote working', conducted among young people working remotely, representing Generation Z conducted in December 2022. The research tool (questionnaire) is proprietary and was prepared by members of the research team - employees of the Department of Applied Sociology and Human Resource Management, Faculty of Management, Częstochowa University of Technology.

The study was conducted with the use of quantitative research methods which utilizes the survey technique. The study included young people from Generation Z with a remote working experience including at minimum the year 2022. Due to the fact that there was no statistics

concerning the number of people aged 15-34 who perform remote work in Poland, the author focused on the group of young, economically active people representing the aforementioned category. Using the Labour Statistical Yearbook 2021 as a reference, the size of the working population in Poland in the age bracket relevant to this study was estimated to be 4,802,000 people. For the population estimated in such a manner, for: fraction size: 0.5; confidence level: 95%; maximum error: 5% the study sample size was set at 384 persons. The study was conducted by a specialist market research agency - Fieldstat Ltd. The survey used quantitative research methods utilizing CATI (Computer Assisted Telephone Interview - 50% of respondents) and CAWI (Computer-Assisted Web Interview - 50% of respondents). The mixed technique was chosen because it allowed to increase the direct contact with the respondent. The research tool used was a standardised questionnaire consisting of 57 closed statements and 8 questions on the socio-demographic characteristics of the respondents. A Likert scale (the so-called Likert scaling technique) was used for the responses, making it possible to determine the relative intensity of the various responses (Babbie, 2004, p. 192). This form allows for a reliable and quick analysis of the collected material, as well as uniformity and ease of elaboration (Churchill, 2002, p. 309).

Contact was made with 2783 persons working remotely. Some of the contacted people declined to participate, some could not participate due to the survey criteria (e.g., no experience of remote working in 2022), or saturation of the sample in terms of age or gender. In the end, 388 correctly completed survey questionnaires were obtained (redundant surveys do not disrupt the planned structure of the study group). The requirement of remote working experience in 2022 was introduced to eliminate the group of workers whose work was organised remotely only due to the COVID-19 outbreak. This is because these workers most often performed their duties and tasks in an extraordinary mode, significantly deviating from the conditions for remote work defined in the literature, with the most basic condition being the freedom to choose this particular form of work. The opinions of respondents who were forced to perform their work remotely due to external circumstances could therefore lead to false conclusions about their attitudes and beliefs.

The STATISTICA software was used in the process of compiling the research results.

### **3. Factor analysis results**

Exploratory factor analysis (EFA) is an inductive procedure used to detect an optimal group of latent variables (factors) that explain the intercorrelations between observed variables. The number of common factors is determined during the analysis, and the decision is based on the amount of variance explained by individual factors. Only after isolating a group of common factors, the correlation between them is interpreted. That procedure is usually implemented

when the researcher has not formulated a theoretical basis for any hypotheses about the correlations between the variables under study (Laudański, 2012).

As a hypothesis, the linear model of exploratory factor analysis can neither be rejected nor falsified by the data to which it is applied. If the results obtained during the exploratory factor analysis cannot be validated, the method is only useful as a technique for formulating or exploring hypotheses that later have to be verified using other methods - for example, confirmatory factor analysis. EFA does not produce proven and verified results. The result of exploratory factor analysis is three matrices: a model matrix for common factors, a diagonal model matrix for specific factors and a correlation matrix of common factors. All the coefficients contained in the above matrices are only numbers and have no empirical significance. Only the researcher's interpretation gives them empirical meaning. The interpretation of the isolated factors is based on factor model analysis. For each factor, the researcher looks for variables with a high loading on that factor and variables with a loading close to zero. Based on the groups of variables thus identified, hypotheses concerning the nature of the factor are formulated. A factor is characterised by what is common to variables strongly saturated with the factor and is not characterised by what is common to variables with minimal loading on the factor (Zakrzewska, 1994, p. 142).

Another application of exploratory factor analysis is the reduction of the number of variables. The need for that may arise when the group of variables representing the domain of interest to the researcher is too numerous and thus inconvenient and difficult to interpret, or when the researcher has a limited study group with a large number of variables. The basic criterion for variable reduction is the principle that the selected group should have as few variables as possible and, at the same time, explain as much as possible of the total variance of the original variables. A mathematical consequence of the above criterion is the relatively low correlation between the selected variables (Zakrzewska, 1994, p. 43).

The factor analysis procedure used in the study consisted of the following stages (Czopek, 2013):

*Stage I* - Verification of the assumptions. The assumptions in factor analysis are similar to those in principal component analysis with the exception that the primary variables should have a normal distribution or be brought to this form by appropriate transformations. The starting point for the calculations is the correlation matrix. A preliminary assessment of existing correlations is made. As a result of the analysis of the 57 variables in the study, two variables were found to have very weak correlations with the other variables and were therefore excluded from further analysis.

One method for verifying whether factor analysis will explain the correlations between the studied variables is Bartlett's test of sphericity (Stanisz, 2007, p. 179). It is based on the chi<sup>2</sup> distribution and requires the assumption that the sample comes from a population characterised by a multivariate normal distribution. That test can be used to verify the hypothesis that the correlation matrix is unitary. A unitary matrix contains ones only on the main diagonal.

Its remaining elements have values equal to zero (no correlation between variables). If the correlation matrix is unitary, the considered variables are independent of each other and each of them defines only one factor - the specific factor. There is no common factor.

The adequacy of the correlation matrix is also assessed using the Kaiser-Meyer-Olkin (KMO) index. It measures the adequacy of the selection of variables (Panek, Zwierzchowski, 2013, pp. 239-240). The index compares the magnitude of the observed correlation coefficients with that of the partial correlation coefficients. Small KMO values suggest that consideration should be given to the validity of applying factor analysis to such data. Kaiser suggests the following interpretation of the magnitude of the KMO index: 0.90 - very high, 0.80 - high, 0.70 - medium, 0.60 - moderate, 0.50 - low and less than 0.50 - very low (not acceptable) (Zakrzewska, 1994, p. 56).

The KMO index values obtained for the 55 variables and Bartlett's test of sphericity allowed to make a positive decision regarding the possibility of using factor analysis to explain the structure of the correlation matrix (Table 1).

**Table 1.**  
*KMO and Bartlett's test of sphericity*

|   |          |
|---|----------|
| KMO   | 0,968    |
| Bartlett's test of sphericity<br>Chi <sup>2</sup> | 20930,68 |
| df  | 1485     |
| significance                                      | 0,0000   |

Source: Own study.

*Stage II* - Determination of the estimation method of the factor analysis model. Solving the factor analysis involves determining the system of factors common to each factor. This is done using one of the basic estimation methods, which include the following (Stanisz, 2007, pp. 224-225):

1. Principal component analysis - developed by Hotelling.
2. Principle factor analysis - developed by Harman.
3. Maximum likelihood method - developed by Lawley
4. Centroid method - developed by Thurstone.

The principal component analysis has gained the greatest recognition among mathematicians. It is set as the default method for factor analysis in Statistica, and it was used as the estimation method in the analysis. It should be noted, however, that the choice of any of the above methods is always subject to a greater or lesser degree of arbitrariness.

*Stage III* - Dimension reduction - selection criteria. The decision on the number of common factors is made before the rotation process and is arbitrary and mechanical. The following reduction criteria are considered (Stanisz, 2007, p. 228; Zakrzewska, 1994, pp. 64-65):

- split-half criterion - the number of factors should be less than half the number of observed variables,
- sufficient proportion criterion - the number of factors taken into account should explain the assumed percentage of variance; in the literature, there are values ranging from 50 to even 80 or 90% of the total variance; it is assumed that 70% is an acceptable value,
- Kaiser criterion - only factors with eigenvalues greater than 1 are used,
- Cattell's scree criterion - finding the point on the line graph from which there is a gentle decrease in the eigenvalues to the right.

Based on the analysis of the aforementioned criteria, the number of factors was set at 7 (Table 2). Such a number of factors explains 72% of the total variance, with the first factor corresponding to the largest eigenvalue explaining as much as 45.5% of the total variance and the second factor - 11.7%. The remaining factors explain from 4.7% to 1.8% of the total variance. Thus, the first two factors explain more than 57% of the total variance.

**Table 2.**  
*Principal Components*

| Factor | Eigenvalue<br>Extraction: Principal Components |                     |                       |                          |
|--------|--|---------------------|-----------------------|--------------------------|
|        | Eigenvalue                                     | Total variance<br>% | Cumulative eigenvalue | Cumulative variance<br>% |
| 1      | 25,05095                                       | 45,54719            | 25,05095              | 45,54719                 |
| 2      | 6,44129  | 11,71143            | 31,49224              | 57,25862                 |
| 3      | 2,63789  | 4,79617             | 34,13013              | 62,05478                 |
| 4      | 1,74604  | 3,17462             | 35,87617              | 65,22940                 |
| 5      | 1,50683  | 2,73969             | 37,38300              | 67,96910                 |
| 6      | 1,30544  | 2,37353             | 38,68844              | 70,34263                 |
| 7      | 1,03688  | 1,88524             | 39,72533              | 72,22787                 |

Source: Own study.

*Stage IV* - Factor rotation. The purpose of a factor analysis is to obtain a simple structure. The simplicity of a factor loading structure lies in the fact that each variable has relatively simplest factor content (Czopek, 2013), i.e. dominant loading on one factor and vice versa - only some of the analysed variables are a measure of a given factor. In practice, it is rarely possible to achieve a factor structure that meets the criteria of a simple structure, but one should strive to obtain a result that is as close as possible to it. In such a case, a factor rotation should be carried out. In most cases, factor rotation reduces the ambiguity of interpretation that may occur in a solution without rotation (Laudański et al., 2012). The VARIMAX, QUARTIMAX, BIQUARTIMAX or EQUAMAX methods are most often used to perform rotation (Zakrzewska, 1994, pp. 69-78), which ultimately determine the interpretation of the model. In the case of the analysed data, all four methods were used in their raw and normalised versions. Ultimately, the VARIMAX normalised method proved to be the most favourable for the substantive interpretation of the results (Table 1).

**Table 1.***Factor structure before and after rotation*

| <b>Factor</b>   |                 | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> |
|-----------------|-----------------|----------|----------|----------|----------|----------|----------|----------|
| Before rotation | <b>Variance</b> | 25,05095 | 6,441288 | 2,637891 | 1,746041 | 1,506831 | 1,305441 | 1,036884 |
|                 | Total           | 0,45547  | 0,117114 | 0,047962 | 0,031746 | 0,027397 | 0,023735 | 0,018852 |
| After rotation  | <b>Variance</b> | 15,37467 | 13,41348 | 3,196040 | 2,076202 | 1,653825 | 3,996389 | 1,083440 |
|                 | Total           | 0,26973  | 0,23532  | 0,056071 | 0,036425 | 0,029014 | 0,070112 | 0,019008 |

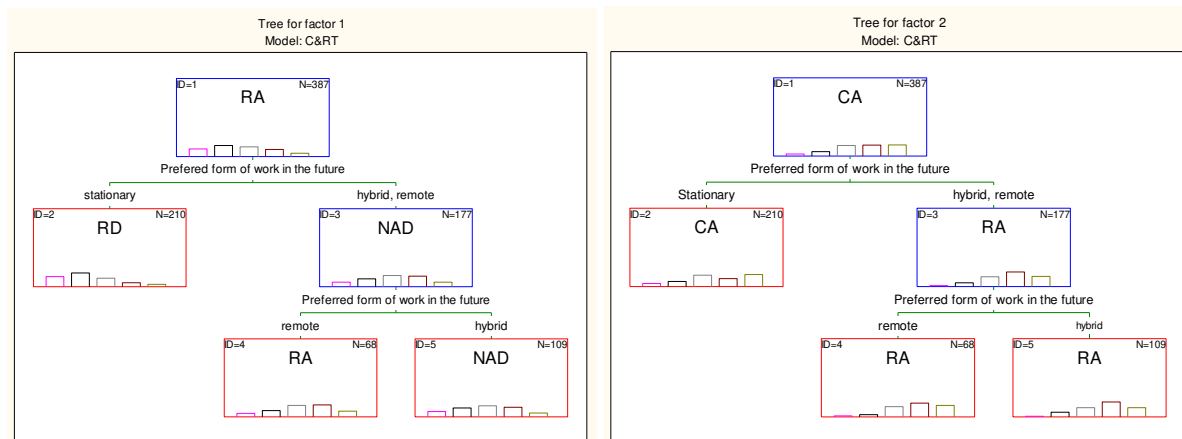
Source: Own study.

*Stage V - Interpretation.* The basic objective of a factor analysis is to determine a matrix of coefficients called factor loadings. To interpret the obtained results, the variables with the highest (in absolute values) factor loadings for the factors are sought (Okón, 1960, pp. 245-250). The factor loadings describe the contribution of a variable to the individual factors. In the course of the analysis, a substantive interpretation of the factors was carried out, resulting in the determination of the following areas describing the respondents' attitudes to the issue of remote work, i.e. influencing their assessment of that form of work:

1. inter-employee relations in the context of mutual learning and motivation,
2. effectiveness in the context of access to formalised knowledge and independence at work,
3. communication efficiency,
4. information overload,
5. flexibility in organising own work,
6. convenience of training arrangement,
7. work-life balance.

Based on the highest values of the factor loadings, representatives of the individual factors were determined and predictions were made based on them using the C&RT model. The analysis of only the first two as well as the dominant factors will be presented in the paper (Figure 1). With regard to factor 1, most respondents emphasised that remote work was not conducive to building inter-employee relationships and trust, which affects the opportunities for mutual learning and motivation. Based on the prediction made, it can be assumed that those who express a negative opinion on that issue will opt for stationary work in the future. Those with an ambivalent attitude regarding that issue will choose to work in a hybrid form, and the respondents who believe that remote work helps maintain relationships will continue to work remotely. Factor 2 should be interpreted in the context of the respondents' views that remote work influences employee efficiency and is based on independence and access to formal knowledge. The respondents who strongly agreed with that opinion declared that they would choose to work remotely in the future. It should therefore be recognised that, in their opinion, remote work has a negative impact on employee efficiency. In contrast, those with a less strong opinion in this regard would choose remote or hybrid work.





CA - completely agree, RA - rather agree, NDA - neither agree nor disagree, RD - rather disagree, CD - completely disagree.

**Figure 1.** C&RT models for factor 1 and 2.

Source: Own study.

## 4. Discussion

An important voice in the scientific discussion as part of the study, which seems to be contrary to the assumptions and available research results describing the technological preferences of Generation Z (Rodriguez et al., 2019; Bencsik et al., 2016; Bencsik, Machova, 2016; Lazanyi, Bilan, 2017; Bejtkovsky, 2016; Hejnova, 2015), is the observation that for employees with a minimum of six months experience in remote work that form of employment is not the most preferred one (only 17.57%). It seems that this should be related to the significance of factor 1, in light of which young people understand the importance of establishing interpersonal relationships in a workplace as these condition the processes of learning and motivation to work. These are key elements for young people gaining professional experience and benefiting from the expertise of colleagues with greater knowledge and work experience (Berhate, Dirani, 2016). This observation is also confirmed by research Dreyer and Stojanová (2022) as well as Hegade and Shettar (2022) that emphasises the importance of personal contact as well as direct communication and the skills associated with it (Hans et al., 2023). As Twenge and King (2005) claim relationship fulfilment play a vital role in young people concepts of a good life.

Organisations should therefore give special consideration to the design of learning processes for Generation Z employees, especially those working remotely. Another voice in the discussion drawing attention to the weaknesses of that form of work is studies Emanuel and Harrington (2023a, 2023b) drawing attention to the negative impact of remote work on employee efficiency. This is also confirmed by research Atkin et al. (2023) oraz Gibbs et al. (2022). Based on the performed factor analysis, that element was also highlighted as factor 2.

The mentioned studies emphasise that remote communication is not conducive to solving everyday problems at work and teleconferences are only a substitute for meetings in the office, *inter alia*. In remote work, the coordination of many processes is prolonged, more complicated, formalised and thus less effective. Remote work is also associated with stagnation in development, both professional and social (Yarbrough, Ramos Salazar, 2023). Based on the study Emanuel et al. (2023), office workers acquire the skills necessary for the job more quickly, which confirms the correlation between organisational learning and employee relationships determined in the study.

## 5. Conclusions

The conclusions drawn from the analysis of the research results are optimistic. The analysed group of young and very young people, contrary to the stereotypical perception, appreciates the importance of knowledge of other employees and not only that "stored" in organisational knowledge repositories. In the context of improving their performance and learning, they appreciate the importance of personal relationships. It may be somewhat surprising that the aspect of work-life balance had little influence on the opinions about remote work. The explanation might be the fact that the respondents were Generation Z employees who were not fully burdened with family responsibilities yet. Obviously, the conducted survey is characterised by certain limitations. Narrowing it down to a specific generation (age group) does not provide insight into whether employees from other age groups assess the dimensions of remote work in the same way. Also, the lack of representativeness of the study due to industries that traditionally offer employees more opportunities to work remotely could distort the results. Undoubtedly, however, the presented attitude of young employees towards knowledge and learning creates a platform for intergenerational knowledge transfer, which should be of interest to both researchers and practitioners, with particular emphasis on HR department employees.

## References

1. Astorquiza-Bustos, B.A., Quintero-Peña, J.W. (2023). Who can work from home? A remote working index for an emerging economy. *Telecommunications Policy*, Vol. 47(10). <https://doi.org/10.1016/j.telpol.2023.102669>.
2. Atkin, D., Schoar, A., Shinde, S. (2023). Working from Home, Worker Sorting and Development, *Working Paper*, 31515. National Bureau of Economic Research. <https://doi.org/10.3386/w31515>
3. Babbie, E. (2004). *Badania społeczne w praktyce*. Warszawa: PWN.
4. Bamieh, O., Ziegler, L. (2022). Are remote work options the new standard? Evidence from vacancy postings during the COVID-19 crisis. *Labour Economics*, Vol. 76. <https://doi.org/10.1016/j.labeco.2022.102179>.
5. Barhate, B., Dirani, K. M. (2021). Career aspirations of generation Z: a systematic literature review. *European Journal of Training and Development*, Vol. 46, No. 1/2, pp. 139-157. doi: 10.1108/EJTD-07-2020-0124.
6. Bartel, C.A., Wrzesniewski, A., Wiesenfeld, B.M. (2012). Knowing where you stand: Physical isolation, perceived respect, and organizational identification among virtual employees. *Organization Science*, Vol. 23(3), 743-757.
7. Bejtkovsky, J. (2016). The Employees of Baby Boomers Generation, Generation X, Generation Y and Generation Z. In: Selected Czech Corporations as Conceivers of Development and Competitiveness in their Corporation. *Journal of Competitiveness*, Vol. 8, Iss. 4, pp. 105-123, DOI: 10.7441/joc.2016.04.07.
8. Bencsik, A., Horváth-Csikós, G., Juhász, T. (2016). Y and Z Generations at Workplaces. *Journal of Competitiveness*, Vol. 8, Iss. 3, pp. 90-106, DOI: 10.7441/joc.2016.03.06.
9. Bencsik, A., Machova, R. (2016). *Knowledge Sharing Problems from the Viewpoint of Intergeneration Management*. Proceedings of The 4th International Conference On Management, Leadership And Governance (ICMLG 2016), pp. 42-50.
10. Charalampous, M. (2020). *A review of the agile working literature in relation to five facets of well-being*. In *Agile Working and Well-Being in the Digital Age* <https://www.palgrave.com/gb/book/9783030602826>, 20.09.2024.
11. Churchill, G.A. (2002). *Badania marketingowe*. Warszawa: PWN.
12. Czopek, A. (2013). Analiza porównawcza efektywności metod redukcji zmiennych - analiza składowych głównych i analiza czynnikowa. *Studia Ekonomiczne. Uniwersytet Ekonomiczny w Katowicach*, Vol. 132, pp. 7-23.
13. Dreyer, C., Stojanová, H. (2022). How entrepreneurial is German Generation Z vs. Generation Y? *A Literature Review*. Vol. 217, 155-164. <https://doi.org/10.1016/j.procs.2022.12.211>.

14. Emanuel N., Harrington E. (2020). *The Payoffs Of Higher Pay: Elasticities Of Productivity And Labor Supply With Respect To Wages, Job Market Paper*, [https://scholar.harvard.edu/files/nataliaemanuel/files/emanuel\\_jmp.pdf](https://scholar.harvard.edu/files/nataliaemanuel/files/emanuel_jmp.pdf), 7.02.2024.
15. Emanuel, N., Harrington, E. (2023a). *Is Work-from-Home Working?* (SSRN Scholarly Paper 4486370). <https://papers.ssrn.com/abstract=4486370>, 7.02.2024.
16. Emanuel, N., Harrington, E. (2023b). *Working Remotely? Selection, Treatment, and the Market for Remote Work* (SSRN Scholarly Paper 4466130). <https://doi.org/10.2139/ssrn.4466130>, 7.02.2024.
17. Emanuel, N., Harrington, E., Pallais, A. (2023). *The Power of Proximity to Coworkers: Training for Tomorrow or Productivity Today?* [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4638214](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4638214), 7.02.2024.
18. Gibbs, M., Mengel, F., Siemroth, C. (2022). *Work from Home and Productivity: Evidence from Personnel and Analytics Data on Information Technology Professionals* (SSRN Scholarly Paper 3841457). <https://doi.org/10.2139/ssrn.3841457>
19. Główny Urząd Statystyczny. *Obszary tematyczne. Roczniki Statystyczne. Rocznik Demograficzny 2022*. <https://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-demograficzny-2023,3,17.html>, 7.02.2024.
20. Goh, E., Lee, C. (2018). A workforce to be reckoned with: The emerging pivotal Generation Z hospitality workforce. *International Journal of Hospitality Management*, Vol. 73, pp 20-28, DOI: 10.1016/j.ijhm.2018.01.016.
21. Hans, S., Nayeem, A.M., Mikkilineni, S., Gupta, R. (2023). Exploring the relationship between generational diversity and knowledge sharing: The moderating role of workplace intergenerational climate, boundary-spanning leadership and respect. *Employee Relations*, Vol. 45(6), pp.1437-1454. <https://doi.org/10.1108/ER-11-2022-0507>.
22. Hegade, P., Shettar, A. (2022). Elevate-Z: A Model to Create Learning Spaces for Generation Z Students. *Journal of Engineering Education Transformations*, Vol. 35(Special Issue 1), pp.175-180.
23. Hejnova, V. (2015). Accession Of Generation Z To Labour Market. In: P. Slavickova, J. Tomcik (eds.), *Znalosti Pro Trzni Praxi 2015: Zeny - Podnikatelky V Minulosti A Soucasnosti* (pp. 199-208). International Scientific Conference on Knowledge for Market Use - Women in Business in the Past and Present. Olomouc, Czech Republic.
24. Journal of Laws of 2023, item 240.
25. Kirchmayer, Z., Fratricova, J. (2018). What Motivates Generation Z at Work? Insights into Motivation Drivers of Business Students in Slovakia. *Innovation Management And Education Excellence Through Vision 2020*, Vol. I-XI, pp. 6019-6030.
26. Krzyżanowska, M. (2020). Z daleka od firmy. In: *HR praca zdalna. HR Personel & Zarządzanie, E-book, Vol. 2*.

27. Laudański, Z., Mańkowski, D.R., Flaszka, M. (2012). Eksploracyjna analiza czynnikowa w badaniach struktury zespołu zmiennych obserwowanych. *Biuletyn Instytutu Hodowli i Aklimatyzacji Roślin*, Vol. 263, pp. 75-89, DOI: 10.37317/biul-2012-0078.
28. Lazanyi, K., Bilan, Y. (2017). Generation Z on the labor market - do they trust others within their workplace? *Polish Journal of Management Studies*, Vol. 16(1), 78-93, DOI: 10.17512/pjms.2017.16.1.07.
29. Morikawa, M. (2023). Productivity dynamics of remote work during the COVID-19 pandemic. *Industrial Relations*, Vol. 62(3), pp. 317-331. <https://doi.org/10.1111/irel.12327>.
30. Okón, J. (1968). *Analiza czynnikowa w psychologii*. Warszawa: PWN.
31. Panek, T., Zwierzchowski, J. (2013). *Statystyczne metody wielowymiarowej analizy porównawczej. Teoria i zastosowania*. Warszawa: Szkoła Główna Handlowa w Warszawie.
32. Rodriguez, M., Boyer, S., Fleming, D., Cohen, S. (2019). Managing the Next Generation of Sales, Gen Z. Millennial Cusp: An Exploration of Grit, Entrepreneurship, and Loyalty. *Journal of Business-To-Business Marketing*, Vol. 26, Iss. 1, pp. 43-55, DOI: 10.1080/1051712X.2019.1565136.
33. Sękala, A., Schultz, O., Foit, K., Blaszczyk, T. (2023). *Technical Education for Industry 4.0: Generation Z's motivation to study technical subjects - a comparative study of selected universities in Denmark and Poland*. Proceedings of the 2023 32nd Annual Conference of the European Association for Education in Electrical and Information Engineering. DOI: 10.23919/EAEIE55804.2023.10181671.
34. Sobierajski, T., Kuszewska, M. (2023). *Pokolenia. Jak uczyć się od siebie nawzajem*. Poznań: Grupa Wydawnictwo Filia sp. z o.o.
35. Stanisz, A. (2007). *Przystępny kurs statystyki z zastosowaniem STATISTICA PL na przykładach medycyny. Tom 3. Analizy Wielowymiarowe*. Kraków: StatSoft.
36. Steyn, A.A., de Villiers, C., Jordaan, J., Pitso, T. (2020). Connecting Generation Z information systems students to technology through the task-technology fit theory. *Communications in Computer and Information Science*, Vol. 1136, pp. 197-210. [https://doi.org/10.1007/978-3-030-35629-3\\_13](https://doi.org/10.1007/978-3-030-35629-3_13).
37. Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., Kundi, G.S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, Vol. 65.
38. Tomaszuk, A., Wasiluk, A. (2023). Pokolenie Z – perspektywa zaufania do przełożonych i współpracowników. *Przegląd Organizacji*, Vol. 2, pp. 83-93. <https://doi.org/10.33141/po.2023.2.9>
39. Tsang, S.-S., Liu, Z.-L., Nguyen, T.V.T. (2023). Family–work conflict and work-from-home productivity: Do work engagement and self-efficacy mediate? *Humanities and Social Sciences Communications*, Vol. 10(1).

40. Twenge, J.M., King, L.A. (2005). A good life is a personal life: Relationship fulfillment and work fulfillment in judgments of life quality. *Journal of Research in Personality*, Vol. 39(3), 336-353. <https://doi.org/10.1016/j.jrp.2004.01.004>.
41. Twenge, J.M. (2024). *Pokolenia. Prawdziwe różnice między pokoleniami X,Y,Z, baby boomersami i cichym pokoleniem oraz co one oznaczają dla przyszłości zachodniego świata*. Sopot: Smak Słowa.
42. Urick, M.J., Hollensbe, E.C., Fairhurst, G.T. (2017). Differences in Understanding Generation in the Workforce. *Journal of Intergenerational Relationships*, Vol. 15(3), pp. 221-240. <https://doi.org/10.1080/15350770.2017.1329583>.
43. Wąsik, A. (2020b). Zasady pracy zdalnej. *HR praca zdalna, E-book, no. 2, HR Personel & Zarządzanie*.
44. Wiktorowicz, J., Warwas, I., Kuba, M., Staszewska, E., Woszczyk, P., Stankiewicz, A., Kliombka-Jarzyna, J. (2016). *Pokolenia - co się zmienia? Kompendium zarządzania multigeneracyjnego*. Warszawa: Wolters Kluwer.
45. Yarbrough, J.W., Ramos Salazar, L. (2023). Virtual onboarding and socialization, an exploration of employee discussions and experiences. *Corporate Communications*, Vol. 28(5), pp. 707-723. Scopus. <https://doi.org/10.1108/CCIJ-12-2022-0158>.
46. Zakrzewska, M. (1994). Analiza czynnikowa wbudowaniu i sprawdzaniu modeli psychologicznych. *Psychologia i Pedagogika*, No. 95. Poznań: Uniwersytet im. Adama Mickiewicza w Poznaniu.

## COMPARATIVE INDICATOR ANALYSIS BASED ON AGGREGATED DATA IN THE CONTEXT OF NEEDS AND INTERPRETATIVE POSSIBILITIES IN A TEMPORAL APPROACH

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**Purpose:** The aim of the work was to demonstrate the interpretation possibilities offered by the presentation of prepared information, which is the result of analytical work and influences the final assessment resulting in the perception of the studied phenomena or the state of the studied object, but also indicates potential or possible interpretational distortions, i.e. potentially erroneous recommendations.

**Design/methodology/approach:** A temporal approach to the issue of comparative indicator analysis that allows for the demonstration of interpretational distortions requires aggregated data sets that are necessary for the correct conduct of inference activities, which translates into the perception of the examined object or issue.

**Findings:** The analysis of the existence of interdependencies or their absence is conditioned by both the time period and reliable data, hence the structured considerations conducted in the subsequent stages of the analytical comparative work will allow for the demonstration of existing similarities, differences or problems.

**Social implications:** Indicator comparative analysis is a tool for collecting information about an object or phenomenon, taking into account the broader context, i.e. society, economy or state of infrastructure. This gives the possibility of comparing the studied object based on the background, enabling conclusions and recommendations.

**Originality/value:** Limiting the distortions in interpretation of the phenomena studied allows us to predict directions of development based on the background, i.e. references to the environment and identified trends, and by making future states more probable, propose final assessments that translate into recommendations or procedures.

**Keywords:** indicator analysis, multi-criteria evaluation, interpretational distortions, aggregated data, indicators.

**Category of the paper:** Conceptual paper and Case study.

### 1. Introduction

Comparative analyses can be both quantitative and qualitative (Potocki, Lasota, 2021). Quantitative methods include searching for patterns, creating forecasts and testing causal

relationships, as well as generalizing the obtained results (Rana, Gutierrez, Oldroyd, 2012). The studies concern broadly understood recommendations, such as inventory management in the context of demand and competition with market shares (Seyed, Zohreh, 2019).

Comparative indicator analysis enables interpretation and ultimately prediction of future states (Kafel, 2013). It also enables deriving recommendations related to the analyzed issues or objects, taking into account the situation in a broader context (Bernat, 2022). This approach enables the discovery and ultimately description of existing relationships, but also similarities or differences, and even interpretational distortions of actual conditions, including time changes that are difficult to capture (Eisenhardt, Sull, 2001). Hence, comparative analysis can be seen as a useful tool for collecting information about an object or phenomenon, taking into account the context of the social, economic or infrastructural situation (Bernat, 2017). This will only be possible on the basis of aggregated data, which will allow to demonstrate the occurrence of various states, including those resulting from the time of the process (Human Development Reports, 2020). This allows for the comparison of temporarily stable states, but also a synthesis indicating potential differences in conditions (The Global Competitiveness Report 2016/2017, 2016). Hence the assumption that comparative analysis conducted in this way will allow to demonstrate the presence or absence of similarities, connections or problems, and in particular to highlight interpretational distortions.

The activities performed at the analytical stage serve to collect the necessary information so that after processing it is possible to present the results (Dalecka, 2016) in categories that are important from the point of view of the adopted research assumptions. Such algorithmic procedural activities are laborious and time-consuming (The Global Competitiveness Report 2016/2017, 2016). Analytical work is multi-stage, and the search for correlations can lead to the recognition of interdependencies (How to conduct reliable documentation..., 2020). The mere noticing and describing difficult to detect or highlighting existing differences or distortions creates a basis for further work, directing them and, consequently, drawing conclusions on recommendations or methods of conduct.

Comparative analysis is used to compare various assessments, such as determining the optimal solution (Fadda et al., 2021) or comparing methods of assessing enterprise performance (Narkunienė, Ulbinaitė, 2018), but the approach related to limiting differences in interpretation is still not sufficiently represented in the literature. This is especially important in the context of available aggregated data. The consequences of differences in the interpretation of the studied phenomena were the subject of the study, in which the discussion aimed to dynamize the debate on the criteria for assessing aggregated data needed for comparative analyses (Neumann, Graeff, 2015).

The comparative analysis of the examined issue should take into account the background of problems or potential interdependencies (Stępień, 2016). Therefore, by definition, the description of the state or process resulting from the conducted analysis should be related to the general conditions constituting the reference point (Bernat, 2022). The aim of such



a procedure is to obtain information correcting the final conclusions. Such an approach is possible and necessary, as it allows to discover or highlight the features of the examined issues against the analytical background (Uchwala KRBR, 2015). This allows to direct the search and conduct an in-depth analysis aimed at bringing the recommendations and the resulting actions closer to the actual, and not only identified needs (Athiyarath, Krishnaswamy, 2020). Hence, the aim of the work was to show possible differences in interpretation caused by the presentation of prepared information resulting from analytical work and influencing the final assessment resulting in the perception of the examined phenomena or the states of the examined object. An example of such an approach is the work describing the selection of benchmarking standards for smart, sustainable cities (Huovila, Bosch, Airaksinen, 2019). This approach is intended to enable indicating directions and methods of action, which is reflected in potential or recommended actions.

## **2. Comparative multi-criteria analysis**

Comparative multi-criteria analysis allows for the compilation of various indicators describing the state of the object being studied or the course of the phenomenon and comparing them for selected criteria (Bernat, 2023). For example, if a selected object was analyzed, then based on the background using a number of criteria, it is possible to assess the functioning of the object being studied in various areas. In the cited example, the assessment of the object allows for indicating similarities or differences, and this in the context of leaders or objects forming the same group. Hence the conclusion that the situation of the object being studied should be related not only to leaders (Bernat, 2019). Then, it is possible to indicate significant differences within the framework of the criteria adopted for analysis. This in turn illustrates the main directions and scale of challenges and the distance between the object being studied and the research background.

The challenges of the preparatory stage result not only from the adopted goals or criteria, but also from the way of describing the issues studied relating to society (poverty, inequality, well-being) or, to a lesser extent, the economy (economy, finances), as well as the geopolitical situation or infrastructure problems (Ciais et al., 2021). These difficulties constitute a challenge and, at the same time, an impulse to describe not only temporal states - current or momentary, but also to conduct analytical work in the context of the probability of specific events in the future based on available historical data (Matthew et al., 2020).

Another problem is collecting useful and comparable data. In the analyzed case, there were also areas (expenditures on education, research and development) that required interpretation. This in turn can affect information distortions, despite the comparability of data (Table 1). A proposal that limits the problem posed in this way is multi-criteria analysis, which is

necessary to determine the current state and possible future states. Only then will it be possible to plan actions that really aim at improving the areas studied.

Conducting an analysis of the initial state in order to indicate areas that should be included in the comparative analysis, but also to determine the method of measuring and assessing the state described by a given criterion requires both reliable data and a correct procedure (Rostkowski, 2019). Therefore, a useful and aggregated set of data is necessary (Human Development Statistical Annex, 2019) on the basis of which analyses can be conducted in correlation with the adopted research assumptions. This allows for the study of the dynamics of changes occurring in the indicated time periods (Table 1).

**Table 1.**  
*Human Development Index HDI and its components*

| HDI 2017 | Country/development level of the group/region | HDI   | The life expectancy at birth | Expected years of schooling | Mean years of schooling | GNI per capita | HDI '16 |
|----------|---|-------|------------------------------|-----------------------------|-------------------------|----------------|---------|
| Pos.     | Name  | value | number of years              | number of years             | number of years         | 2011 PPP \$    | Pos.    |
| 5        | Germany                                       | 0,936 | 81,2                         | 17                          | 14,1                    | 46136          | 4       |
| 19       | Japan   | 0,909 | 83,9                         | 15,2                        | 12,8                    | 38 986         | 19      |
| -        | Very high                                     | 0,894 | 79,5                         | 16,4                        | 12,2                    | 40 041         | -       |
| 27       | Czech Republic                                | 0,888 | 78,9                         | 16,9                        | 12,7                    | 30 588         | 27      |
| 33       | Poland  | 0,865 | 77,8                         | 16,4                        | 12,3                    | 26 150         | 34      |
| 38       | Slovakia                                      | 0,855 | 77,0                         | 15,0                        | 12,5                    | 29 467         | 39      |
| 45       | Hungary                                       | 0,838 | 76,1                         | 15,1                        | 11,9                    | 25 395         | 45      |
| -        | Europe and Central Asia                       | 0,771 | 73,4                         | 14,1                        | 10,3                    | 15 331         | -       |

Note. Gross national income (GNI) per capita estimated using purchasing power parity (PPP).

Source: [http://hdr.undp.org/sites/default/files/2018\\_human\\_development\\_statistical\\_update.pdf](http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf), 30.03.2020.

Comparative analysis allows for highlighting a number of dependencies, while illustrating - necessary for the proper conduct of the synthesis process - the connections and complexity of these connections. Here, one can also conduct considerations regarding the reference of the situation of the examined object to the background in the context of complexity, ambiguity, uncertainty and dynamics of the changes taking place (Staruch, 2019). This is to enable a correct description of existing dependencies. Since the processes are dynamic and take place over time, and the connections are assessed post factum, indicators that clearly describe the changes taking place will be necessary. Therefore, the conclusions resulting from the conducted analyses may be burdened with uncertainty. Consequently, this may exclude them from further work. Hence the proposal to supplement the analytical work with a time approach. In this way, it will be possible to exclude some of the indicators as unsuitable for further analytical work. Therefore, the analysis should be conducted, so that it is possible to demonstrate the dependencies in relation to the issue being examined. Comparative multi-criteria analysis is a proposal to balance the uncertainty accompanying the inference, but only on the condition that the analytical work is properly conducted, taking into account their staged nature (Bernat, 2023).

Analytical work should, if possible and certainly justified, include clearly defined time frames indicating regularities occurring there (Lachowski, 2019), including trends or tendencies describing changes occurring or their absence. This in turn requires searching for indicators reflecting the suggested perspective of looking at the analyzed phenomena or objects. In order to obtain a more complete picture of the studied process or state, it is necessary to collect information from many different, and above all reliable and objective, and therefore verifiable sources (Bernat, 2019), which is a challenge for researchers at the stage of preparing assumptions for analytical work.

### 3. Interpretational distortions

Comparison of aggregates such as GDP or GNI, inflation, unemployment or employment (<https://www.money.pl/gospodarka/wskazniki/pkb/>, 2019) levels enables both analysis of the social situation and assessment of economic prospects. Importantly, these prospects can be scaled over the years or selected research periods, thus describing in a dynamic approach the changes taking place, e.g. economic changes describing market behavior, but also differences between the objects or phenomena studied or emerging interpretational discrepancies. Fig. 1 shows an example of presentation of data included in Table 2 concerning unemployment. In turn, the data included in Table 3 concern inflation.

**Table 2.**

*Unemployment as of 1.11.2019 - data for figure 1a*

| Indicator            | Date      | Value [%] | Annual change in % |
|----------------------|-----------|-----------|--------------------|
| unemployment         | 1.11.2019 | 5,10      | -13,56             |
| number of unemployed | 1.11.2019 | 849600,0  | -13,72             |
| new unemployed       | 1.11.2019 | 122500,0  | -70,45             |

Source: Money.pl, unemployment, <https://www.money.pl/gospodarka/inflacjabezrobocie/#>, 31.03.2020.

The data in Tables 2 and 3 are presented in different analytical approaches. In the case of both unemployment and inflation, the annual percentage changes are estimated on a reference basis, and therefore describe the relational dependencies and not the actual state of the analyzed issue, hence, for example, referring to annual changes described in percentage terms highlights the large amplitude of these changes, which, however, is not confirmed by the analysis of the course of the studied phenomenon, as shown in Fig. 1.

**Table 3.***Inflation as of 1.11.2019 - data for figure 1b*

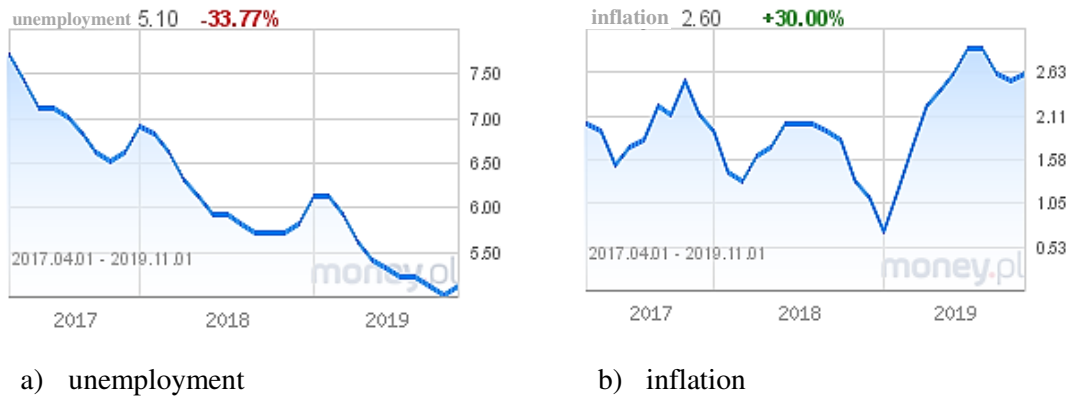
| Indicator     | Date      | Value [%] | Annual change in % |
|---------------|-----------|-----------|--------------------|
| Inflation I   | 1.11.2019 | 2,60      | +52,94%            |
| Inflation II  | 1.11.2019 | 0,10      | -66,67%            |
| Inflation III | 1.11.2019 | 2,50      | +400,00%           |
| Inflation IV  | 1.11.2019 | 2,20      | +83,33%            |

Source: Money.pl, unemployment, <https://www.money.pl/gospodarka/inflacjabezrobocie/#>, 31.03.2020.

As it results from the analysis of the information content of Table 3, it is necessary to provide a definition of the indicator in order to be able to relate it to the current situation in the context of the changes taking place. Thus: inflation I is defined in relation to the same month of the previous year, and inflation II in relation to the previous month, while inflation III in relation to December of the previous year. Inflation IV, in turn, is the average annual inflation indicator, i.e. the average of inflation I from the last 12 months, and hence, i.e. from the method of measuring the indicator, such dynamic, and presented in Table 3, annual changes in percentage terms.

The differences between the data in Table 3 and Figure 1b are explained by the definitional description of the indicator, i.e. in this case the way of defining inflation itself and showing the value of the indicator (2.2%) or the changes taking place (+83.33%) - here in annual terms. It is similar in the case of unemployment (compare Table 2 with Figure 3a. Therefore, analytical data can describe the situation in a longer time perspective, as shown in Figure 1, but also illustrate relational dependencies, i.e. in a specific interpretational approach as presented in Tables 2 and 3. And only the comparison of the information content in the appropriate time period, taking into account the definitional content of the indicator, shows the proper perspective for assessing a given phenomenon. In the analyzed example, this concerns unemployment and inflation.

Indicators that aggregate several variables, such as HDI, seem to be more important from the point of view of assessing future states, e.g. of the economy, but also of the quality of life of society - because they have greater information and interpretation potential - which confirms the assumptions of the comparative multi-criteria analysis. Since the Human Development Index (HDI) reflects the quality of life, in this case (Table 1) we get a social space described by three dimensions: a) health, b) education and c) standard of living. Thanks to the data prepared in this way, we can observe and compare changes over the years and their dynamics (Human Development Reports..., 2019).



**Figure 1.** Unemployment and inflation comparison.

Source: Money.pl, unemployment, <https://www.money.pl/gospodarka/inflacjabezrobocie/#>, 31.03.2020.

There are also significant differences due to the measures used. In the case of the HDI index, gross national income (GNI) per capita was used. This significantly reduces the ranges that are visible when using GDP as a measure. It is also important whether we conduct the considerations in relation to purchasing power (PPP). Then the differences can be as much as 189% (Bernat, 2023), and this can cause various distortions and consequently discrepancies interpretation. For the reasons mentioned above, the Gini coefficient itself will also be useful for illustrating the changes taking place. Therefore, the assessment requires a set of comparable criteria reflecting the situation within the adopted time period, which determines the purpose of the work, which comes down to both needs and interpretation possibilities. Here, we can talk about a "periodic" time analysis. However, in addition to examining the time and amplitude of the phenomenon - as described above - we can also conduct research on the frequency and trends of changes taking place. This requires further work and indicators that allow for comparative analysis.

## 4. Conclusions

Comparative multi-criteria analysis is a proposal resulting from the research assumption indicating the necessity of conducting a directional analysis based on the research background in order to enable an indicator assessment that meets the interpretation needs. Interpretation possibilities in turn result from the adopted assessment criteria. Hence, considerations conducted in the form of analytical comparative works, aimed at demonstrating existing similarities, connections or problems and their correlations or finally interpretational distortions, seem to be the most beneficial analytical approach providing a number of useful, reliable and, equally importantly, comparable data.

The use of useful and recognized, and therefore commonly used indicators such as: GDP, HDI or locally developed, such as IOR - the indicator of responsible development or IZR - the indicator of sustainable development will be an acceptable way of assessing the issue under study, corresponding to the assumptions of comparative multi-criteria analysis. This then allows for reference to the environment, i.e. research background, which systematizes the assessment, directing further analytical work aimed at describing - within the concept of mutual interactions - possible or potential connections, dependencies and interactions.

The research work concerned determining a useful analytical procedure by taking into account the time factor manifested by local stable states. Further work will aim to include trends in the conducted analyses as determinants of ongoing changes.

The starting point of the conducted considerations was a quantitative comparative analysis aimed at a narrative comparative analysis, hence the difficulties in collecting appropriate cases. Narrative analysis takes into account the context of the event and the results for a given case. This allows - on the basis of reference, i.e. taking into account the context - to interpret the findings understood as recommendations. Ultimately, the recommendation and direction for further work will be a cross-analysis, so that we can interpret the similarities and differences of the issues studied. This will highlight the factors influencing the result, and with a time perspective, the next step will be to include trend analysis as the basis for further research. Using multiple data sources and methods allows for triangulation of information, and thus reducing its uncertainty, ambiguity and complexity by eliminating interpretational distortions.

Comparative analysis, the purpose of which is to describe the phenomena taking place or to demonstrate the current state of the object being studied against the background of the reference, aims to demonstrate dependencies or discrepancies with the description of the actual state. It is also necessary to take into account interpretational distortions – differences – related to the information, the content of the presented indicators or the specific time perspective of the analyses conducted. Both verifiable data and the correct procedure are elements necessary to implement the research assumptions, i.e. a description, the purpose of which is to demonstrate the presence or absence of connections and interactions, and thus correlation or their absence, which requires designating a) areas of analysis, b) defining measures necessary to assess the state of the described objects and phenomena, c) many criteria, because only then can the considerations be conducted contextually. In a broader context taking into account amplitude, time and frequency. Capturing and highlighting existing differences makes it possible to improve the interpretational adjustment, and more importantly, to limit interpretational distortions.

The temporal approach of the issues studied allows for the recognition of the dynamics of changes taking place and minimizing distortions, and consequently differences in interpretation and their impact on the final assessment and recommendations.

Comparative indicator analysis based on aggregated data enables the description of the issue, taking into account the needs, but also the possibilities of interpretation. The credibility of the information obtained results from both the adopted indicators and the research background. Taking into account the temporal approach allows for searching for interpretational discrepancies, which can be an element of further analytical work. Indicator analysis based on aggregated data improves efficiency, but also reduces interpretational discrepancies, which is particularly important in the context of searching for probable future states of the objects or phenomena being studied.

## References

1. Athiyarath, S.P, M., Krishnaswamy, S.A. (2020). Comparative Study and Analysis of Time Series Forecasting Techniques. *Sn. Comput. Sci.*, 1, 175. DOI: <https://doi.org/10.1007/s42979-020-00180-5>
2. Bernat, P. (2017). Zarządzanie gminą a jakość życia mieszkańców. In: M. Huchrak, T. Iwanek (eds.), *Bezpieczeństwo społeczności lokalnych* (pp. 88-105). Oficyna Wydawnicza PWSZ w Nysie.
3. Bernat, P. (2019). Zrównoważony rozwój a analiza wskaźnikowa sytuacji społeczno-gospodarczej na podstawie danych agregowanych. In: M. Huchrak, T. Iwanek (eds.), *Zrównoważony rozwój a bezpieczeństwo społeczności lokalnych* (pp. 109-128). Nysa: Oficyna Wydawnicza PWSZ w Nysie.
4. Bernat, P. (2022). Definable Functional Linkages as a Tool for Shaping Organisational Space in Management Strategies. *Papers of Silesian University of Technology, Organization and Management Series*, no. 163, pp. 21-31, DOI: <http://dx.doi.org/10.29119/1641-3466.2022.163.2>
5. Bernat, P. (2023). Comparative indicator analysis based on aggregated data in the context of needs and interpretative possibilities in procedural terms. *Papers of Silesian University of Technology, Organization and Management Series*, no. 181, pp. 29-39.
6. Ciais, P. et al. (2021). Empirical estimates of regional carbon budgets imply reduced global soil heterotrophic respiration. *National Science Review*, Vol. 8, Iss. 2, *nwaa145*. Retrieved from: <https://doi.org/10.1093/nsr/nwaa1450>, 5.09.2023.
7. Dalecka, A. (2016). Zastosowanie procedur analitycznych w wykrywaniu manipulacji księgowych. *Finanse, Rynki Finansowe, Ubezpieczenia*, no. 4(82), cz. 1, pp. 323-334, DOI: 10.18276/frfu.2016.4.82/1-27
8. Eisenhardt, K.M., Sull, D.N. (2001). Strategy as Simple Rules. *Harvard Business Review*, no. 79(1), pp. 89-95.

9. Fadda, E. et al. (2021). Comparative analysis of models and performance indicators for optimal service facility location. *Transportation Research, Part E: Logistics and Transportation Review*, Vol. 145, 102174.
10. <http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WMP20170000260/O/M20170260.pdf>
11. <https://www.un.org/sustainabledevelopment/>
12. <https://www2.deloitte.com/pl/pl/pages/press-releases/articles/nagroda-social-impact-w-ramach-rankingu-deloitte-technology-fast-50-ce.html>
13. Human Development Reports (2019). Retrieved from: <https://www.un.org/sustainabledevelopment/>, 4.09.2023.
14. Human Development Statistical (2019). Retrieved from [http://hdr.undp.org/sites/default/files/2018\\_human\\_development\\_statistical\\_update.pdf](http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf), 30.03.2020.
15. Huovila, A., Bosch, P., Airaksinen, M. (2019). Comparative analysis of standardized indicators for Smart sustainable cities: What indicators and standards to use and when? *Cities*, Vol. 89, pp. 141-153, ISSN 0264-2751, <https://doi.org/10.1016/j.cities.2019.01.029>
16. Jak przeprowadzić analizę (2020). Retrieved from: <https://consider.pl/jak-przeprowadzic-analize-danych-etapy-dzialania-obliczenia/>, 1.05.2020.
17. Kafel, T. (2013). Kierunki badań w zakresie zarządzania strategicznego wobec współczesnych wyzwań. *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Krakowie*, no. 922, pp. 83-102.
18. Lachowski, W.K. (2019). *Wykorzystanie procedur analitycznych w procesie badania sprawozdań finansowych*. Polska Izba Biegłych Rewidentów. Retrieved from: [https://www.pibr.org.pl/static/items/publishing/Wykorzystanie\\_procedur\\_Lachowski\\_CE\\_PIBR\\_prezentacja.pdf](https://www.pibr.org.pl/static/items/publishing/Wykorzystanie_procedur_Lachowski_CE_PIBR_prezentacja.pdf), 1.05.2020.
19. Matthew, H.D. et al. (2020). Opportunities and challenges in using remaining carbon budgets to guide climate policy. *Nature Climate Change*, 30 November 2020, DOI:10.1038/s41561-020-00663-3
20. Narkunienė, J., Ulbinaitė, A. (2018). Comparative analysis of company performance evaluation methods. *Entrepreneurship and Sustainability*, Iss. 6(1), pp. 125-138. [ff10.9770/jesi.2018.6.1\(10\)ff.ffhal-02121048](https://doi.org/10.9770/jesi.2018.6.1(10)ff.ffhal-02121048)
21. Neumann, R., Graeff, P. (2015). Quantitative approaches to comparative analyses: data properties and their implications for theory, measurement and modelling. *Eur. Polit. Sci.*, 14, 385-393. <https://doi.org/10.1057/eps.2015.59>
22. Polski Instytut Ekonomiczny (2019). *Indeks Odpowiedzialnego Rozwoju*. Retrieved from: [http://pie.net.pl/wp-content/uploads/2019/02/PIE-Indeks\\_Odpowiedzialnego\\_Rozwoju.pdf](http://pie.net.pl/wp-content/uploads/2019/02/PIE-Indeks_Odpowiedzialnego_Rozwoju.pdf), 4.09.2023.
23. Potocki, P., Lassota, I. (2021). Jakościowa analiza porównawcza (QCA) jako nowa metoda badawcza w nauce o polityce: zarys zagadnienia. *Studia Politologiczne*, vol. 59, *Studia i Analizy, Studia Politologiczne*, 59.



24. Rana, J., Gutierrez, P.L., Oldroyd, J.C. (2021). Quantitative Methods. In: A. Farazmand (ed.), *Global Encyclopedia of Public Administration, Public Policy, and Governance*. Cham: Springer. [https://doi.org/10.1007/978-3-319-31816-5\\_460-1](https://doi.org/10.1007/978-3-319-31816-5_460-1)
25. Rostkowski, D. (2019). *Indeks Odpowiedzialnego Rozwoju alternatywą dla PKB?* Retrieved from: <https://www.obserwatorfinansowy.pl/forma/rotator/indeks-odpowiedzialnego-rozwoju-alternatywa-dla-pkb/>, 4.09.2023.
26. Seyed, M.M., Zohreh, D.S. (2019). *A Short Introduction to Comparative Research*, <https://www.researchgate.net/publication/336278925>
27. Staruch, M., Jurek, M. (2019). Narzędzia i techniki modelowania i wspomagania procesów biznesowych - studium przypadku. *Nowoczesne Systemy Zarządzania*, vol. 14, no. 3, ISSN 1896-9380, pp. 57-66.
28. Stępień, P., Miciuła, I. (2016). Kontrola zarządcza w procesie zarządzania ryzykiem w organizacjach gospodarczych. In: J. Nowakowska-Grunt, J. Kabus (ed.), *Współczesne aspekty badawcze. Gospodarka-Świat-Człowiek: aspekty teoretyczno-praktyczne badań naukowych, cz. IV* (pp. 73-80). Katowice: Wydawnictwo Naukowe Sophia.
29. *The Global Competitiveness Report 2016/2017* (2017). Retrieved from: [http://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017\\_FINAL.pdf](http://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf), 1.09.2023.
30. *Uchwała KRBR* (2015). Retrieved from: <https://www.pibr.org.pl/assets/file/499,KRBR-uchwala-2783-52-2015-KSRF-520.pdf>, 1.05.2020.
31. *Wybrane wskaźniki*, <https://www.money.pl/gospodarka/wskazniki/pkb/>, 8.03.2019.



## GENDER IMBALANCE IN THE MARITIME INDUSTRY IN POLAND: IMPEDIMENTS AND INITIATIVES TO IMPROVE WOMEN POSITION IN MALE-DOMINATED INDUSTRY

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**Purpose:** The research aims to analyze the situation of women in maritime industry in Poland over the years, focusing on employment trends and the participation of women in maritime-related academic programs. Additionally, the research will explore the challenges women face and propose potential solutions to overcome these barriers to improve gender equality.

**Design/methodology/approach:** To achieve the study's objectives, bibliometric analysis and systematic literature review were conducted to examine previous research on gender inequality in the maritime industry. Additionally, a statistical analysis was performed to identify the share of women in the maritime industry and in maritime-related academic programs in Poland.

**Findings:** The study reveals an increasing trend in the participation of women in Poland's maritime industry, both in education and employment. The paper provides insights into the challenges and strategies for achieving gender equality in the maritime industry. The obstacles women face in the male dominated industry should be addressed not only at the governmental level but also at the organizational level, with required engagement of both authorities and business leaders.

**Research limitations/implications:** The conducted analysis is restricted only to female employment in one country within a specified industry. A comparative study of women's position in male-dominated industry across different European countries would allow for an expanded context of gender inequality, especially its roots, efforts to combat gender stereotypes, and changes in corporate culture.

**Practical implications:** Practical steps include implementing comprehensive gender equity policies, enhancing educational programs to include gender sensitivity, and creating mentoring and networking opportunities for women. By adopting best practices from other countries and focusing on both governmental and organizational levels, a more inclusive and equitable workplace can be created.

**Originality/value:** This paper offers new insights into the trends and challenges faced by women in this male-dominated sector. Additionally, this study contributes to the broader literature on achieving gender equality and diversity in workplaces by compiling practical initiatives undertaken not only in the maritime industry but also in other male-dominated industries.

**Keywords:** gender inequality, gender stereotypes, male-dominated industry, maritime industry.

**Category of the paper:** Research paper, Literature review.

## 1. Introduction

The gender imbalance in the maritime industry is a global issue (MacNeil, Ghosh, 2017; Murali, Rajasekar, 2018). The maritime industry is traditionally male-dominated, making it challenging for women to enter and work within it. Women comprise just 2% of the total workforce (Jeevan et al., 2020). Women in the maritime industry face numerous challenges, including stereotypes, safety concerns, and prejudice against them (Şenbursa, Ozdemir, 2020). Despite efforts to bridge the gender gap, historical barriers within the maritime sector persist, impeding the full integration of women (MacNeil, Ghosh, 2017). Moreover, the gender gap is evident in the number of women enrolling in engineering programs and joining the labor market, impacting the development of solutions and products in the engineering sector (García-Holgado et al., 2018; García-Holgado, Gonzalez-González, 2021).

More broadly, gender inequality in the maritime industry is not a new problem. Maritime professions, among the oldest in the world, were regarded as a single-gender areas until the 20th century (Yılmaz et al., 2015). Historically, women have faced significant barriers in the maritime industry, with limited success in integrating into skilled production jobs in Norway's largest shipyard from 1965 to 1989 (Jeevan et al., 2020).

However, women played crucial roles as underwriters, creditors, commission agents, and policyholders, supporting maritime and colonial policies in pre-modern Europe (Wade, 2024). In the 1800s and early 1900s, some of the earliest women surgeons in England, America, and Russia began their surgical careers in military service or providing combat casualty care. Women at sea served unpaid nursing roles in the 1700s and provided informal medical care in the 1800s (Hernandez et al., 2024).

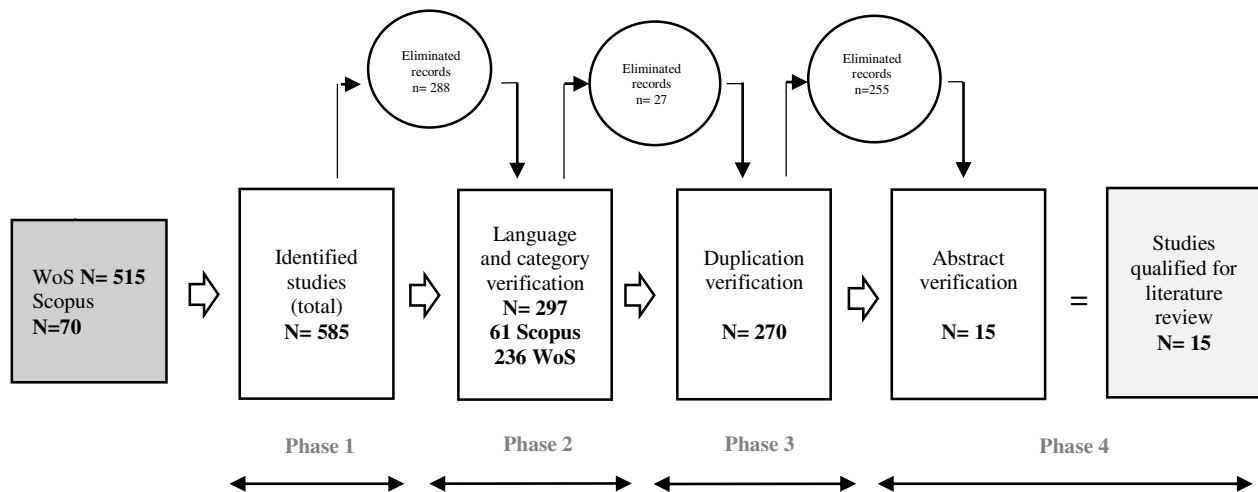
The historical and ongoing gender imbalance in the maritime industry is a complex issue that requires continuous effort to address. In this article, we aim to investigate the extent to which women currently face the difficulties in hiring and working in the maritime industry, identifying the barriers and potential solutions. Recognizing and valuing the contributions of women in this field is crucial for creating a more equitable and innovative industry. To achieve this, we first conducted a systematic literature review to identify the current situation and possible barriers in the male-dominated industries, particularly in the maritime sector. Next, we focused on the presence of women in the Polish maritime industry and we identified initiatives aimed at improving their position in this male-dominated sector. Through this analysis, we hope to provide insights and recommendations for fostering a more inclusive maritime industry.

## 2. Literature review design

The issues of gender imbalance in the maritime industry requires in-depth analysis. In the field of management, there is a growing interest in seeking mechanisms to find, refine, and synthesize the available evidence on a given research topic due to the increase in the number of publications (Riaño-Casallas, Rojas-Berrió, 2023). The systematic literature review (SLR) brings rigor and a structured framework to make sense of a sometimes confusing, fragmented, and overlapping area of management research (Clark et al., 2021). There are several existing guidelines on how to conduct and evaluate SLR, such as Snyder, 2019; Block, Fisch, 2020; Kuckertz, Block, 2021. One classification of SLR guidelines, which will be used in the current study, indicates the following steps: (1) Defining the research question; (2) Determining the required characteristics of primary studies; (3) Retrieving a sample of potentially relevant literature; (4) Selecting the pertinent literature; (5) Synthesizing the literature; (6) Reporting the results (Sauer, Seuring, 2023). The authors have defined the research questions (step 1) as follows:

1. What kind of impediments do women face when developing their career in maritime industry?
2. What is the percentage of female students of maritime departments in Poland, and how does this influence women's entry into the maritime industry?
3. What is the percentage of women employed in the maritime industry in Poland, and what is the percentage of women among new hires?
4. What initiatives are aimed at improving the situation of women in maritime industry, and what could be done in Poland?

Moving to the second step, bibliometric analysis and literature review were the primary methods used to conduct the theoretical study. Specifically, the temporal scope of the study covers the years 2000-2024, which outlines the changing role of women's employment in the maritime industry worldwide. The Web of Science Core Collection and Scopus were two knowledge databases used in search for relevant publications. The four-phase process of identifying the works qualifying for SLR is shown in Figure 1.



Note:

1. Query: (Women OR Female) AND (Shipyard OR Shipbuilding OR Maritime OR Male dominated industry) AND (Gender OR Inequality OR Stereotypes Or Pay gap) AND NOT (Military).
2. Knowledge base search criteria: WoS: topic, Scopus: title, topic, keywords.
3. Only documents such as articles, conference paper (Scopus)/proceeding paper (WoS) and book chapters were included in the study.
4. Publication period: 2000-2024.

**Figure 1.** The process of identifying documents qualifying for systematic literature review (SLR).

Source: Authors' elaboration based on Web of Science Core Collection and Scopus, 17.05.2024.

As shown in Figure 1, based on the search query formulated, specified category verification, language verification, and abstract verification, only 15 documents out of the 585 identified potentially relevant documents (step 3) were qualified for the detailed literature review. During the selection process (step 4), articles from database categories other than “business economics”, “women’s studies”, “engineering”, and “social issues” in the Web of Science database, as well as “social sciences”, “business, management and accounting”, “economics, econometrics and finance”, and “engineering” in Scopus database, including papers written in languages other than English, were eliminated. At the abstract evaluation stage, documents addressing the women’s roles and employment in various industries but not specifically in the maritime industry additionally were excluded from the sample. For example, many articles focused on women’s position in male-dominated industries, such as: technology (Miric et al., 2023), automotive (Evans-Krimme, 2023), aviation (de Andreis, 2023), oil (Kräft, 2022), construction (Kakad, 2002; Haupt, 2010; Ackrill et al., 2017; Chileshe, Hickey, Cui, 2020), ICT (Segovia-Pérez et al., 2020), industrial design (Walters, 2018), mining (Laplonge, 2016), aerospace (Yulia et al., 2020), engineering (Lourens, Truter, 2023), energy (Zarate, 2023), IT (Edwards, 2015). Furthermore, some excluded articles presented cross-sectoral studies concerning gender wage gap in construction, manufacturing, and urban farming industries (Ayalu et al., 2023), or architecture, civil engineering and construction occupations (Manesh et al., 2020). Other research highlighted the need to increase career equality, especially among young women in the transport industry (Rönnlund, Tollefsen, 2023) and in the creative communication industry, which is typically dominated by male leadership (Olsen, LaGree,

2023). One study emphasized the need to identify strategies for attracting and retaining females in construction industry (Tunji-Olayeni et al., 2017). Additionally, some research focused on eliminating inequalities that concerned women's leadership roles in organizations (Netchaeva et al., 2022; Wang et al., 2019) or stressed the necessity to explain the underrepresentation of women leaders within the industry (Bryan et al., 2021).

Moving to the step that concerns synthesizing the results of systematic literature review (5), the authors distinguished different impediments faced women in the maritime industry:

- Educational level:
  - Gender discrimination among university students: For instance, women cannot find jobs in the industrial diving sector due to restrictions of Turkish Labor Law, despite receiving maritime education (FiDan et al., 2020);
  - Influence of gender culture beliefs and social information: Gender culture beliefs significantly and negatively affect female students' choice of gender-atypical major. Social information from professional referents is also critical in determining female students' choice (Ku et al., 2017);
  - Deficiency in maritime education and training: Current education and training do not sufficiently prepare future seafarers to be gender and cultural sensitive (Belev et al., 2020);
  - Lack of education: There is a general deficiency in maritime education (MacNeil, Ghosh, 2017).
- Career development level:
  - Gender inequality at the recruitment stage (Tang, 2023);
  - Lack mechanisms for cultivating marine affairs talents and personnel recruitment: There is a lack of comprehensive systems for talent development and recruitment (Lee et al., 2022);
  - Difficulty finding a job as an apprentice onboard: Few companies employ women onboard (Szozda et al., 2014);
  - Different standards for leadership evaluation: Women are evaluated differently even though they are performing exactly similar to their male counterparts (Fjærli et al., 2017);
- Psychological and emotional impediments:
  - Various form of harassment: Harassment has significantly affects women's occupational health, safety, and wellbeing (Pike et al., 2021);
  - Gender stereotypes: Isolation, sexual harassment, discrimination, lack of amenities and support networks contribute to these stereotypes (MacNeil, Ghosh, 2017);
  - Feeling of loss in success: Women often feel they must sacrifice their family life for their career (Bhirugnath-Bhookhun, Kitada, 2017).

- Sociological impediments:
  - Work-family balance conflict: women managers struggle to balance work and family life (Bhirugnath-Bhookhun, Kitada, 2017; Vo et al., 2023);
  - Training practices reinforcing gender biases: The socialization of cadets is fraught with the values and symbols of a hegemonic masculinity, sidelining other genders (Acejo, Abila, 2016);
  - Nationality, race/ethnicity, and gender factors: These influence women's positions in stratified maritime workforce (Chin, 2008).
- Economic impediments:
  - Unequal employment opportunities (MacNeil, Ghosh, 2017);
  - Poor working conditions lead to significant occupational illness among the women, short job tenure, and a sustaining intra-occupational gender pay gap (Croucher, Økland, 2021).

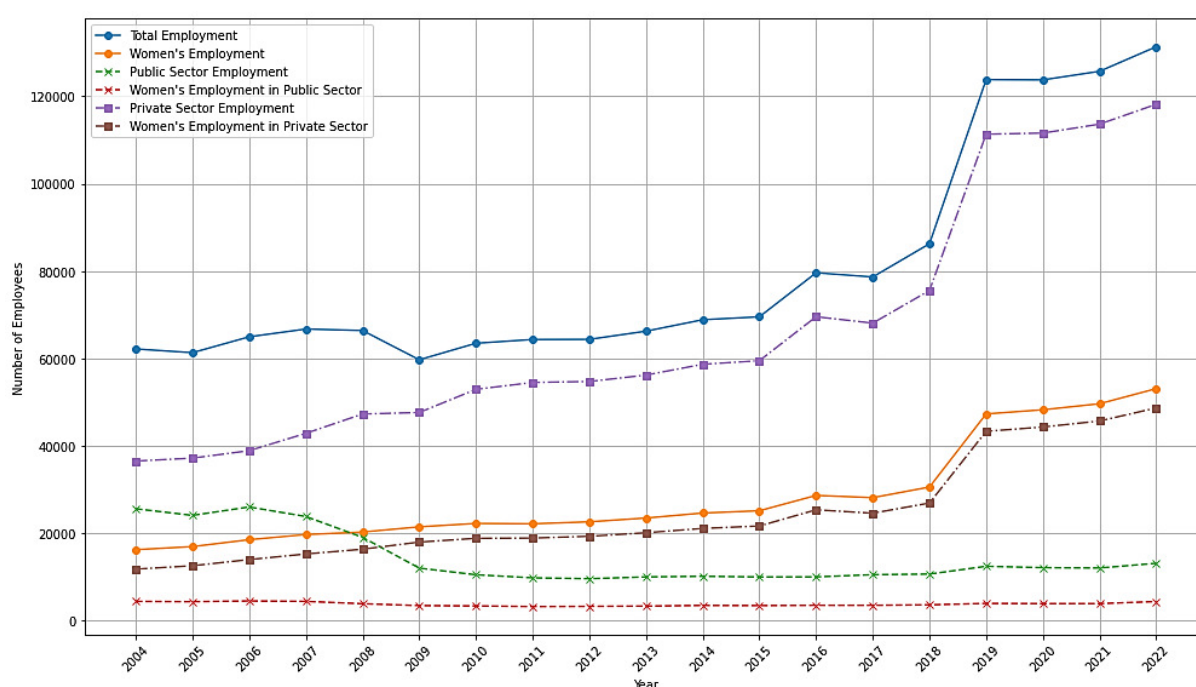
Moreover, detailed conclusions can be made based on the literature review (Step 6). The literature review allowed the authors to identify the researchers (Chin, 2008; Szozda et al., 2014; MacNeil, Ghosh, 2017; Ku et al., 2017; Bhirugnath-Bhookhun, Kitada, 2017; Belev et al., 2020; FiDan et al., 2020; Pike et al., 2021; Lee et al., 2022; Vo et al., 2023) who proposed incentives to suppress this impediments. These findings address our first research question and are presented in the further sections of the article. Furthermore, one out of 15 articles selected for the literature review focused on the comparison between man and women in maritime industry rather than solely on the impediments faced by women. This article examined differences between the personality attributes between men and women as onboard crew (Cojocararu et al., 2018).

There is a lack of international studies comparing the position of women in the maritime industry across different countries. Most selected studies focus on the women's position in specific countries, such as United Kingdom (Pike et al., 2021) Turkey (FiDan et al., 2020), Bulgaria and Croatia (Belev et al., 2020) Norway (Croucher, Økland, 2021), Taiwan (Lee et al., 2022), or specific regions, such as Eastern and Southern Africa (Bhirugnath-Bhookhun, Kitada, 2017). There is also a lack of current studies that present the increased interest of women in choosing gender-atypical majors. Only 1 out of 15 articles examined this interest, focusing on young women studying maritime navigation in Poland (Szozda et al., 2014).



### 3. Women position in maritime industry in Poland – analysis

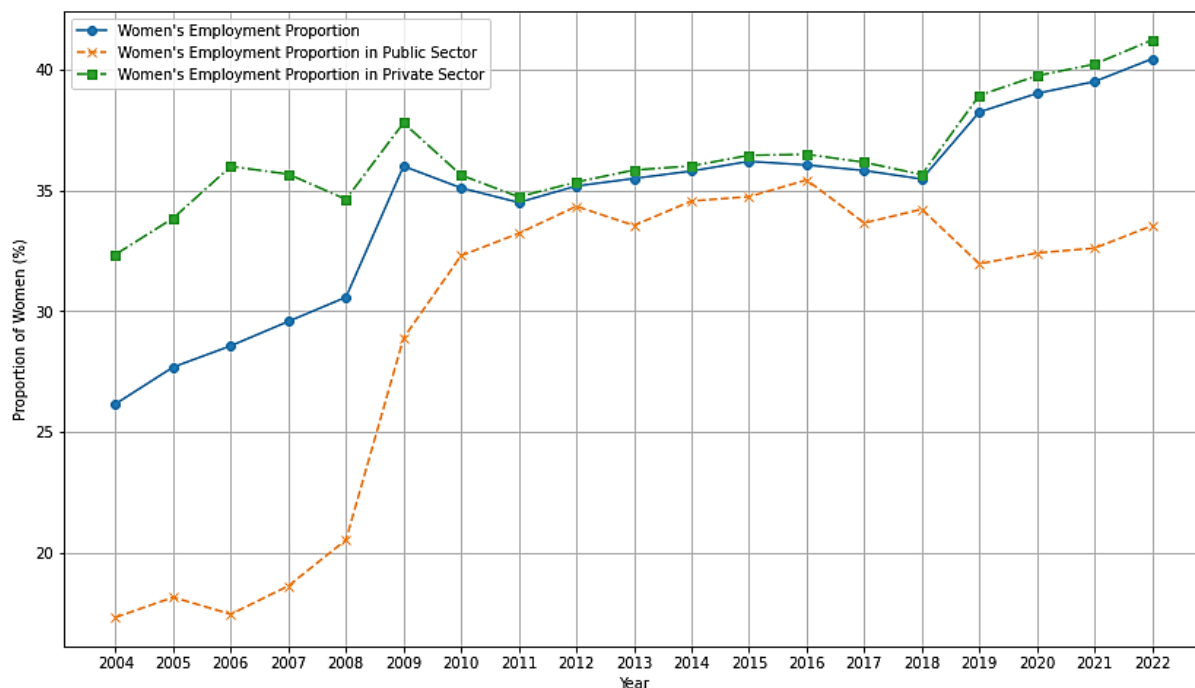
The authors of the article adopted classification by Statistics Poland, which defines the basic scope of maritime economy for statistical purposes according to Polish Classification of Activities (Rocznik Statystyczny Gospodarki Morskiej, 2023)<sup>1</sup>. Descriptive statistics were used to analyze the data obtained in this manner. The primary focus was to examine the percentage change in the ratio of employed women to the total workforce, the trends in new hires, and how these relate to the number of graduates from maritime programs. Additionally, we analyzed the differences between various types of activities within the maritime industry to identify disparities in women's participation across different sectors.



**Figure 2.** Employment Trends in Maritime Industry in Poland (2004-2022).

Source: Rocznik Statystyczny Gospodarki Morskiej 2004-2022, Główny Urząd Statystyczny, stat.gov.pl, 5.06.2024.

Women's employment trends closely follow the total employment trends but at a lower scale (Figure 2). This explains a consistent increase in the number of women employed over the years, with significant growth from 2017 onwards. The private sector shows higher fluctuations in employment, with peaks similar to the overall employment trends. Women's employment in the public sector is particularly unstable, with more pronounced growth rate changes compared to the overall public sector employment. Private sector employment growth rates are more stable compared to the public sector, with fewer extreme fluctuations.



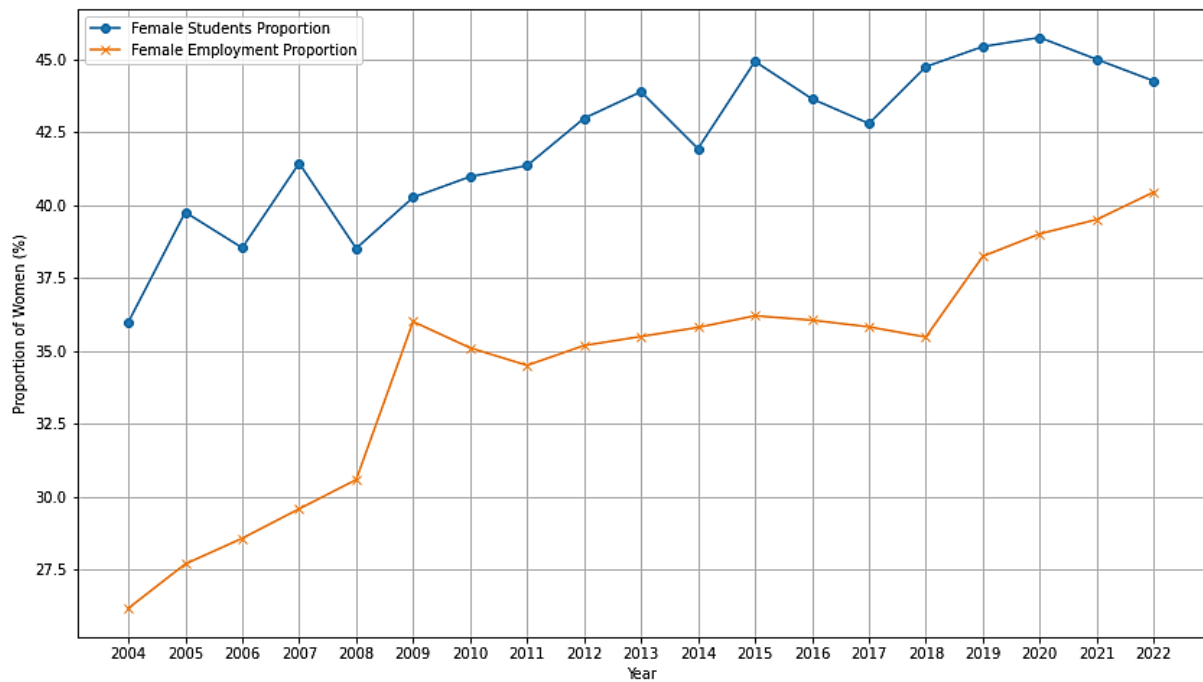
**Figure 3.** Proportion of Women's Employment in Privat and Public Sector of Maritime Industry (2004-2022).

Source: Rocznik Statystyczny Gospodarki Morskiej 2004-2022, Główny Urząd Statystyczny, stat.gov.pl, 5.06.2024.

The proportion of women's employment has generally increased over the years, both in total employment and within the public and private sectors. The private sector consistently shows a higher proportion of women compared to the public sector. The public sector, while having a lower proportion of women, shows a steady but slower increase compared to the private sector.

In addition to examining the trends in overall female employment, this study also compared the hiring of new employees and the proportion of women among all newly hired workers. The general trend in female employment in the maritime industry, irrespective of sector, was also analyzed. The percentage of women hired in the private sector has varied. From 2004 to 2007, the percentage remained around 35%. A significant increase occurred in 2008, with the percentage rising to around 40% by 2012. This high level fluctuated but generally remained between 35% and 40% up to 2022. The public sector saw a notable increase in the percentage of women hires starting in 2008. From 2004 to 2007, the percentage of women hires was relatively low, fluctuating around 5-7%. From 2008 onwards, there was a significant upward trend, reaching around 20% by 2011. Between 2011 and 2022, the percentage of women hired in the public sector generally ranged between 25% and 35%. The percentage has stabilized around 30% in the most recent years.

The proportion of female students in maritime studies has been generally increasing over the years from 35.98% in 2004/05 to 44.25% in 2022/23 (Figure 4).

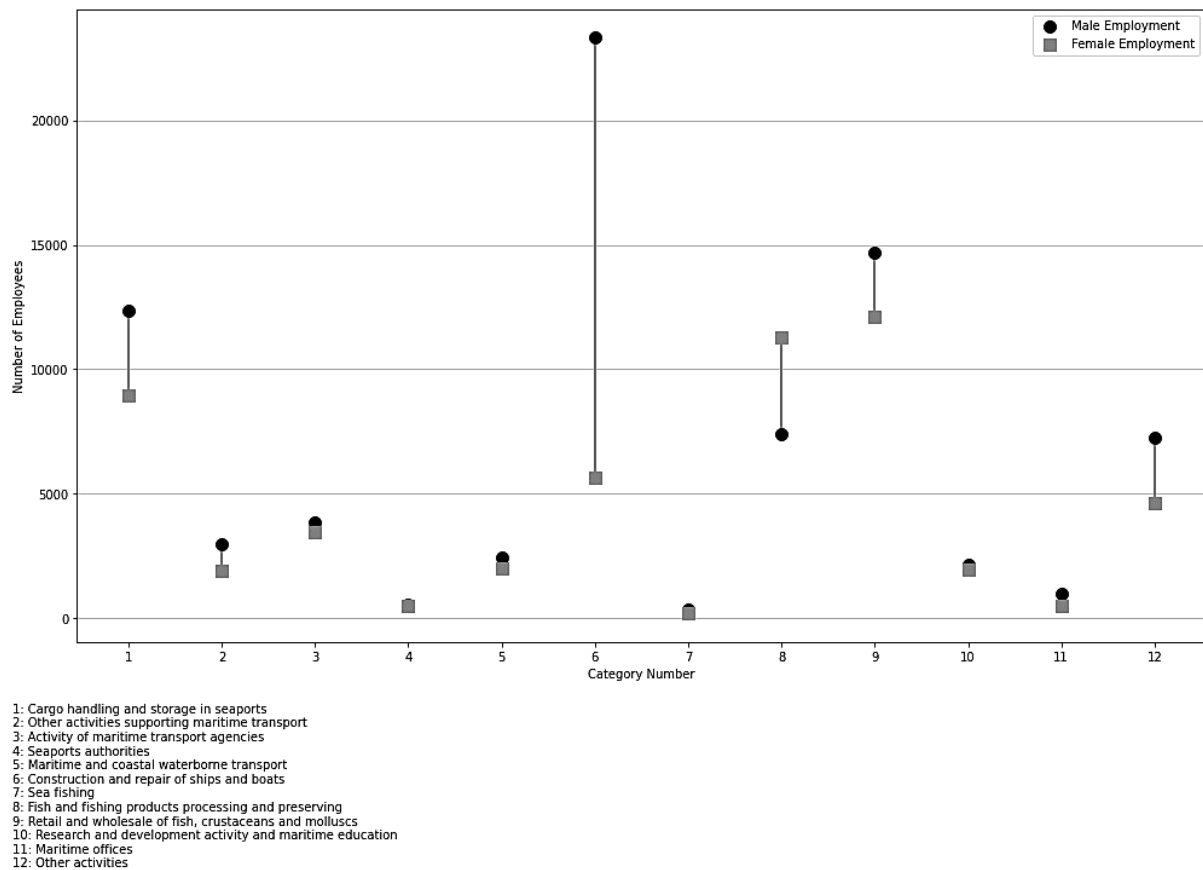


**Figure 4.** Proportion of Female Students vs. Female Employment in Maritime Industry (2004-2022).

Source: Rocznik Statystyczny Gospodarki Morskiej 2004-2022, Główny Urząd Statystyczny, stat.gov.pl, 5.06.2024.

There were notable increases around 2010/11 and 2015/16, peaking at 45.74% in 2020/21. The growth rate of female students in maritime studies is generally higher than the growth rate of female employment in the maritime industry. There is a slight lag in the employment data following the trends in student data, which is expected as students transition from academia to the workforce. The stable percentage of female maritime students suggests a consistent supply of qualified women entering the job market.

Previous research revealed that female representation varies significantly across different maritime-related activities (Nastali, Bartlett, 2022). Data analysis of Polish maritime industry confirmed this phenomenon. The proportion of female employment across various maritime-related activities for the year 2022 differ significantly (Figure 5).



**Figure 5.** Comparison of Male and Female Employment by Category in 2022.

Source: Rocznik Statystyczny Gospodarki Morskiej 2004-2022, Główny Urząd Statystyczny, stat.gov.pl, 5.06.2024.

Categories such as fish processing, research and development, and maritime agencies show higher female participation, while traditional sectors like construction and repair stay behind.

The data reveal a positive trend in the participation of women in the maritime industry, both in education and employment. Since 2017, there has been a significant increase in the number of women employed in the sector, particularly in the private sector, which consistently shows a higher proportion of female employees compared to the public sector. Despite the growth, the private sector experiences more stable employment trends, while the public sector shows greater instability.

The increasing proportion of female students in maritime studies suggests a promising future for gender diversity in the industry. The lag between the peaks in female student enrollment and corresponding increases in employment highlights the transition period from education to the workforce.

#### 4. Recommendations from other countries that can be applied in Poland

Based on research conducted in male-dominated industries and studies within the maritime industry, we can conclude that improving gender balance and increasing women's participation requires actions at three levels: organizational, institutional, and within technical universities educating future maritime industry workers.

First, maritime industry can use benchmark to improve gender equality. The systematic literature review conducted in the section "Literature research design" allowed the authors of the article to present recommendations postulated by researchers to overcome the barriers that affect women in some areas of maritime sector in Poland. These recommendations are as follows:

- Ensure consistent and ongoing education, training, and sensitization workshops in maritime sector businesses. Balance technical with non-technical training, especially leadership and soft skills, to ensure that seafarers are better equipped to function in a fast-changing industry. Training at all levels, from cadets to senior officers, and developing further mentoring opportunities within maritime institutions and across organizations are key (Pike et al., 2021; Belev et al., 2020; Ku et al., 2017; MacNeil, Ghosh, 2017; Szozda et al., 2014).
- Add the topic of gender equity to maritime educational institutions' curriculums, using a systematic and gender-sensitive approach to increase awareness and promote equality among the next generation of maritime professionals (MacNeil, Ghosh, 2017).
- Support women seafarers at every stage of their careers and enable more of them to complete their career cycles. Successful careers bring women into leadership roles where they can promote gender equality, making women's voices heard, and add women's perspectives in decision-making (Tang, 2023).
- Establish partnership between individual institutions and industry associations/organizations to provide long-term career coaching, networking, and fellowship opportunities to increase the retention of women in the industry (MacNeil, Ghosh, 2017).
- Raise awareness among sector dignitaries to eliminate prejudice against women (FiDan et al., 2020).
- Improve onboard experiences by enhancing the occupational health, safety, and wellbeing of all seafarers, regardless of gender, by improving the experiences of women on board (Pike et al., 2021).
- Advocate for labor rights in concern with gender and racial/ethnic equality (Chin, 2008), enforce the right for women to have access to medical and sanitary items on board all seagoing vessels (MacNeil, Ghosh, 2017).

- Create policies that support a work-family balance and retain talented women in the industry (Vo et al., 2023). Policymakers should consider creating a more conducive working environment for women to support them in achieving a better work-life balance, thus reducing societal cost (Bhirugnath-Bhookhun, Kitada, 2017).
- Develop zero-tolerance policies for sexual harassment and discrimination that are blanket across the industry and are mandatory for staff inductions (MacNeil, Ghosh, 2017).
- Launch marketing campaigns to recruit more young women into potentially rewarding careers and to reduce the possibility of future skills shortages (MacNeil, Ghosh, 2017).
- Set industry targets for increasing female membership in transport unions to give women a fair and equal voice and facilitate the prioritization of issues relevant to them (MacNeil, Ghosh, 2017).
- Create short- and long-term goals and methods to continually monitor and measure the progress of integrating women into the maritime sector. This provides insight into the health of the industry and encourages further development of strategies as required (MacNeil, Ghosh, 2017).
- Conduct further research to explore range of masculinities on board across ethnicities to achieve a more nuanced understanding of gender relations on board (Acejo, Abila, 2016). Additionally, identify up-to-date statistical information on women in the maritime industry, focusing on areas such as role imbalances, pay imbalances, employment trends, and other relevant facts (MacNeil, Ghosh, 2017).

Surveys of maritime stakeholders reveal that revising gender requirements, implementing comprehensive gender policies in shipping companies, and tackling negative attitudes toward women are crucial steps toward eliminating gender inequality in the maritime industry (Dragomir, 2018; Şenbursa, Ozdemir, 2020; Tang, 2023). Implementing research-informed toolkits for gender equality training can drive positive actions and foster institutional change. For instance, Chance, Mihajlović Trbovc (2021) highlight that universal initiatives, such as unconscious bias training that includes both men and women, tend to receive strong support and have minimal unintended consequences. Cundiff et al. (2018) suggest that framing diversity initiatives as inclusive for all genders, rather than exclusively targeting women, can promote a sense of identity safety for both women and men, enhancing the overall effectiveness of these initiatives. Conversely, Smith et al. (2023) note that initiatives exclusively targeting women, like female leadership programs, often receive mixed reactions and may inadvertently reinforce gender divides.

Achieving gender balance requires a multifaceted approach, with committed leadership playing a key role. According to (Grimson J., Grimson W., 2019), significant interventions include promoting work-life balance and addressing unconscious bias within organizations. Empowering women to tackle challenges such as the glass ceiling, pay disparities,

and caregiving responsibilities is crucial. This can be effectively achieved by providing networking and mentoring opportunities and promoting authentic leadership (Ozdemir, Albayrak, 2018). Additionally, fostering an organizational climate that supports diversity is essential for improving gender balance in leadership roles, ensuring that women have the necessary support and opportunities to advance their careers (Kulich, Bosak, 2019).

International organizations also play important roles in improvement gender equality. The International Maritime Organization (IMO) and the International Labour Organization (ILO) advance gender equality in maritime shipping through robust legal frameworks and policies (Kormych, 2020; Jeevan et al., 2020; Shemiakin et al., 2024). The example of such initiatives is "Making Waves: Women leaders in the maritime world" (Balasanyan, Phutkaradze, 2018). Reflecting this commitment, the United Nations highlighted "Empowering Women in the Maritime Community" as the theme for World Maritime Day, underscoring the importance of creating equal opportunities for all gender groups (Lee et al., 2022) The United Nations 2030 Agenda for Sustainable Development emphasizes achieving gender equality and empowering all women and girls, highlighting the importance of challenging gender stereotypes (Mella, 2022).

Additionally, regulation at national level significantly define women's role in society (Cabeza-García et al., 2019; Rubenstein, Young, 2016). For instance, positive laws imposing gender quotas in the boardroom have been shown to trigger gender diversity (Cabeza-García et al., 2019) It's worth noting here that anti-discrimination laws by themselves have proven ineffective at countering discrimination against women. The effectiveness could be improved by combining them with tools of information such as guidance materials (Smith, 2014).

Educational institutions, particularly technical universities, are crucial in promoting gender equality. For instance, García-Holgado & Gonzalez-González (2021) emphasize the importance of instilling gender equality values in engineering students, fostering an inclusive culture from the ground up.

Successfully integrating women in Maritime Education and Training (MET) demands a balanced approach that blends top-down directives with bottom-up engagement. Researchers emphasize the importance of involving practitioners in transforming their attitudes and practices, thereby enhancing the effectiveness of implementation (Barahona-Fuentes et al., 2022). Additionally, Maleki & Stephens (2017) note that role models serve as significant motivational factors for female students pursuing careers in maritime engineering, inspiring the next generation of women engineers.

These findings address the last research question, but it should be noted that a deeper insight in this subject is required within further research, especially cautious consideration which initiatives implemented on the governmental and organizational level will achieve social recognition in male-dominated industry such as maritime industry in Poland.

## 5. Discussion

The changes over the years in the proportion of women in maritime employment in Poland reflect global trends. These proportions are increasing worldwide. However, the actual situation seems to be even better than the average participation of women employees in the maritime industry according to the International Maritime Organization (IMO) and the Women's International Shipping & Trading Association (WISTA). They estimate women currently account for only 29% of the overall workforce in the general maritime industry and 20% of the workforce of national maritime authorities in member states (Nastali, Bartlett, 2022). These figures indicate that while Poland is progressing, there is still room for improvement. It is especially important to note that the participation of women is not uniform across sectors or all types of activities within the maritime industry. Furthermore, in the maritime sector, women are especially underrepresented in leadership roles (Barreiro-Gen et al., 2021; Ortega et al., 2015). This lower representation of women in certain positions or areas highlighting the need for targeted interventions.

The barriers for better women's representation include deeply ingrained gender biases, lack of supportive policies such as flexible work arrangements, and limited access to career development opportunities like mentorship and leadership training. Research suggests that these issues are particularly pronounced in sectors traditionally dominated by men, such as shipbuilding and repair, where cultural resistance to gender diversity is often stronger (MacNeil, Ghosh, 2017). Moreover, the role of policy and legislation should not be underestimated in addressing gender disparities. Countries that have implemented gender quotas in leadership positions or introduced family-friendly policies, such as extended parental leave or flexible work schedules, have seen marked improvements in gender balance across sectors (Cabeza-García et al., 2019). In Poland, adopting similar policies tailored to the maritime sector could provide the structural support needed to encourage more women to enter and remain in the industry. At the international level, organizations like the International Maritime Organization (IMO) continue to push for gender equality through global frameworks that advocate for fair treatment and non-discriminatory practices (Jeevan et al., 2020). The role of education and training is also critical in shaping the future of gender diversity in the maritime industry. Data shows that the proportion of female students in maritime studies has been steadily increasing, which bodes well for future employment trends (Figure 4). However, simply increasing enrollment is not enough. Institutions must ensure that their curricula are inclusive and designed to prepare women for both operational and leadership roles in the industry. This includes providing technical training, as well as fostering leadership skills and offering mentorship programs that support women as they transition from education to the workforce (García-Holgado, Gonzalez-González, 2021).

By leveraging knowledge and best practices from other countries, Poland can better address observed disparities and further enhance gender diversity in its maritime sector.



## 6. Conclusion

The conducted research enabled the authors to find answers to the research questions. Firstly, it allowed to identify impediments that women face in maritime industry and classify them into specific groups: impediments at educational and career development level, psychological and emotional impediments, sociological impediments, and economic impediments. Secondly, the study revealed an increasing trend in the participation of women in Poland's maritime industry, both in education and employment. Finally, the paper provided insights into the challenges of achieving gender equality in the maritime industry in Poland.

The study contributes to the broader literature on achieving gender equality and diversity in workplaces by compiling practical initiatives undertaken in male-dominated industries, particularly in the maritime industry. The issue of gender inequality in male-dominated industries is significant and frequently discussed in the literature. However, the study addresses a relatively unexplored sector of the maritime industry, particularly in Poland, where there is a significant lack of research on the position of women in this industry. The research has practical implications as it identifies critical areas where intervention is needed and suggests directions and methods for such interventions. Authors are aware of the research limitations. The current analysis is restricted to female employment in the maritime industry within a single country. Due to the lack of studies that present the percentage of women employed in the maritime industry across different regions or continents, a comparative study of women's position in the male-dominated industries, such as those in European Union countries, would be of significant value. This approach could expand the context of gender inequality, especially regarding its roots, gender stereotypes, and the changes in corporate culture. Furthermore, it would allow for more comprehensive understanding of multinational activities that could improve the position of women in male-dominated industries.

For future research, the authors intend to focus on the position of women in male-dominated industries, particularly within the European Union. The research aims to investigate women's reasons for choosing to study on male-dominated faculties and to evaluate the future career opportunities in maritime industry in comparison to activities undertaken to address the gender impediments in business practices. The authors plan to conduct comprehensive studies that will focus on various stages of women's careers in the maritime industry across European countries. This includes examining biases at the educational level, challenges faced by women entering the industry, and difficulties encountered in achieving leadership positions.

## References

1. Acejo, I.L., Abila, S.S. (2016). Rubbing out gender: women and merchant ships. *Journal of Organizational Ethnography*, Vol. 5, Iss. 2, pp. 123-138, doi: 10.1108/JOE-01-2016-0004
2. Ackrill, R., Caven, V., Alaktif, J. (2017). 'Black Boxes' and 'fracture points': the regulation of gender equality in the UK and French construction industries. *International Journal of Human Resource Management*, Vol. 28, Iss. 21, pp. 2977-2996, doi: 10.1080/09585192.2016.1277366
3. Ackrill, R., Caven, V., Alaktif, J. (2017). 'Black Boxes' and 'fracture points': the regulation of gender equality in the UK and French construction industries. *International Journal of Human Resource Management*, Vol. 28, Iss. 21, pp. 2977-2996, doi: 10.1080/09585192.2016.1277366
4. Ayalu, G., Abbay, A.G., Azadi, H. (2023). The role of micro- and small-scale enterprises in enhancing sustainable community livelihood: Tigray, Ethiopia. *Environment, Development and Sustainability*, Vol. 25, Iss. 8, pp. 7561-7584, doi:10.1007/s10668-022-02359-7
5. Balasanyan, A., Phutkaradze, Z. (2018). Women in the maritime industry. *AGA 2018 - 19th Annual General Assembly (AGA) of the International Association of Maritime Universities (IAMU)*, pp. 329-334.
6. Barahona-Fuentes, C., Kitada, M., Castells-Sanabra, M. (2022). *Empowering teachers in Maritime Education and Training (MET) through gender-equality training: A bottom-up approach for the implementation of current legislation*. Proceedings of the International Association of Maritime Universities Conference, 2022-October.
7. Barreiro-Gen, M., Lozano, R., Temel, M., Carpenter, A. (2021). Gender equality for sustainability in ports: Developing a framework. *Marine Policy*, Vol. 131, doi:10.1016/j.marpol.2021.104593
8. Belev, B., Mrčelić, G.J., Jurić, Z., Karin, I. (2020). Analysis of female interest in maritime education at Nikola Vaptsarov Naval Academy Varna and at the Faculty of Maritime Studies, University of Split. *Transactions on Maritime Science*, Vol. 9, Iss. 2, 342-349, doi: 10.7225/toms.v09.n02.016
9. Bhirugnath-Bhookhun, M., Kitada, M. (2017). Lost in success: women's maritime careers in Eastern and Southern Africa. *Palgrave Communications*, Vol. 3, Iss. 1, doi: 10.1057/palcomms.2017.23
10. Block, J.H., Fisch, C. (2020). Eight tips and questions for your bibliographic study in business and management research. *Management Review Quarterly*, Vol. 70, Iss. 3, pp. 307-312, doi:10.1007/s11301-020-00188-4
11. Bryan, A., Pope, S., Rankin-Wright, A.J. (2021). On the Periphery: Examining Women's Exclusion From Core Leadership Roles in the "Extremely Gendered" Organization of

- Men's Club Football in England. *Gender and Society*, Vol. 35, Iss. 6, pp. 940-970, doi: 10.1177/08912432211046318
12. Cabeza-García, L., Del Brio, E.B., Rueda, C. (2019). Legal and cultural factors as catalysts for promoting women in the boardroom. *BRQ Business Research Quarterly*, Vol. 22, Iss. 1, pp. 56-67, doi: 10.1016/j.brq.2018.06.004
  13. Chance, S., Mihajlović Trbovc, J. (2021). *Integrating Gender And Inclusivity Into Research Planning*. Proceedings of the SEFI 49th Annual Conference: Blended Learning in Engineering Education: Challenging, Enlightening - and Lasting?, pp. 1550-1555.
  14. Chileshe, N., Haupt, T.C. (2010). An empirical analysis of factors impacting career decisions in South African construction industry: Male and female high school students' perspectives. *Journal of Engineering, Design and Technology*, Vol. 8, Iss. 2, pp. 221-239, doi: 10.1108/17260531011062573
  15. Chin, C.B.N. (2008). Labour flexibilization at sea. *International Feminist Journal of Politics*, Vol. 10, Iss. 1, pp. 1-18, doi: 10.1080/14616740701747584
  16. Clark, W.R., Clark, L.A., Raffo, D.M., Williams, R.I. (2021). Extending Fisch and Block's (2018) tips for a systematic review in management and business literature. *Management Review Quarterly*, Vol. 71, Iss. 1, pp. 215-231, doi: 10.1007/s11301-020-00184-8
  17. Cojocaru, C.L., Popa, C., Albayrak, T., Toma, A. (2018). Professional Adjustment Variables Onboard the Seagoing Ships. *IOP Conference Series: Earth and Environmental Science*, Vol. 172, Iss. 1, doi: 10.1088/1755-1315/172/1/012026
  18. Croucher, R., Økland, G.M. (2021). Women production workers' introduction into a Norwegian Shipyard 1965-1989. *Business History*, Vol. 63, Iss. 5, pp. 776-794, doi: 10.1080/00076791.2019.1642327
  19. de Andreis, F. (2023). Increasing the Participation of Women in Aviation. Analysis and Strategies in a Male-Dominated Industry. In: P. Paoloni, R. Lombardi, (Eds.), *When the Crisis Becomes an Opportunity. SIDREA Series in Accounting and Business Administration*. Cham: Springer, doi: 10.1007/978-3-031-21932-0\_27
  20. Dragomir, C. (2018). The role of maritime labour convention in reducing maritime gender inequalities. *Journal of Physics: Conference Series*, Vol. 1122, No. 1, doi: 10.1088/1742-6596/1122/1/012036
  21. Edwards, C. (2015). How the gender-gap algorithm was built. *Engineering and Technology*, Vol. 10, Iss. 10, pp. 54-57, doi: 10.1049/et.2015.1005
  22. Evans-Krimme, R. (2023). Internal coaching: Prejudice against women leaders. In: W.-A. Smith, E.H. Pontes, D. Magadlela, D. Clutterbuck, *Ethical Case Studies for Coach Development and Practice: A Coach's Companion* (pp. 129-132). London: Routledge.
  23. FiDan, V., Günay, E., Akpınar, G., Atacan, C. (2020). Gender Discrimination Perception among Maritime Students in Turkey. *Journal of Eta Maritime Science*, Vol. 8, Iss. 3, pp. 162-176, doi: 10.5505/jems.2020.31932

24. García-Holgado, A., Gonzalez-González, C. (2021). A pilot study about the perception of experts in engineering education. *ACM International Conference Proceeding Series*, pp. 133-137, doi: 10.1145/3486011.3486433
25. Garcia-Holgado, A., Mena, J., Garcia-Penalvo, F.J., Gonzalez, C. (2018). Inclusion of gender perspective in Computer Engineering careers: Elaboration of a questionnaire to assess the gender gap in tertiary education. *IEEE Global Engineering Education Conference, EDUCON, 2018-April*, pp. 1547-1554, doi: 10.1109/EDUCON.2018.8363417
26. Grimson, J., Grimson, W. (2019). Eliminating Gender Inequality in Engineering, Industry, and Academia. *Philosophy of Engineering and Technology*, Vol. 32, doi: /10.1007/978-3-319-99636-3\_15
27. Hernandez, A.A., Sobocinski, A.B., Tadlock, M.D. (2024). Anchors Aweigh! The History of Women Surgeons at Sea. *Journal of the American College of Surgeons*, Vol. 238, Iss. 5, pp. 814-820, doi: 10.1097/XCS.0000000000001038
28. Hickey, P.J., Cui, Q. (2020). Gender Diversity in US Construction Industry Leaders. *Journal of Management in Engineering*, Vol. 36, Iss. 5, doi: 10.1061/(ASCE)ME.1943-5479.0000838
29. Jeevan, J., Menhat, M., Mhd Ruslan, S.M., Cetin, Ç.K. (2020). Gender inequality: an outlook from a seaport sector. *Australian Journal of Maritime and Ocean Affairs*, Vol. 12, Iss. 4, pp. 187-199, doi: 10.1080/18366503.2020.1810375
30. Kakad, K. (2002). Gender Discrimination in the Construction Industry: The Case of Two Cities in India. *Gender Technology And Development*, Vol. 6, Iss. 3, pp. 355-372, doi: 10.1177/097185240200600302
31. Kormych, L. (2020). The gender equality in maritime industries: Transnational law perspectives. *Lex Portus*, Vol. 3, Iss. 23, pp. 24-43, doi: 10.26886/2524-101X.3.2020.2
32. Kräft, C. (2022). Equal pay behind the “Glass Door”? The gender gap in upper management in a male-dominated industry. *Gender, Work and Organization*, Vol. 29, Iss. 6, pp. 1910-1926, doi: 10.1111/gwao.12890
33. Ku, K.N., Ye, K.D., Lee, H.S., Lin, H.H., Gan, G.Y. (2017). Factors affecting female students’ choice of maritime majors. *Journal of Marine Science and Technology (Taiwan)*, Vol. 25, Iss. 4, pp. 417-423, doi: 10.6119/JMST-017-0322-1
34. Kuckertz, A., Block, J. (2021). Reviewing systematic literature reviews: ten key questions and criteria for reviewers. *Management Review Quarterly*, Vol. 71, Iss. 3, pp. 519-524, doi: 10.1007/s11301-021-00228-7
35. Kulich, C., Bosak, J. (2019). The persistence of gender inequality in leadership: Still a long way to go? In: K. Gangl, E. Kirchler (Eds.), *A Research Agenda for Economic Psychology*, (pp. 139-153). Northampton: Edward Elgar Publishing, Inc.
36. Laplonge, D. (2016). Exploring the distance between ecofeminism and Women in Mining (WIM). *Extractive Industries and Society*, Vol. 3, Iss. 3, pp. 843-849, doi: 10.1016/j.exis.2016.03.006

37. Lee, H.-C., Tseng, Y.-L., Sung, W.-Y., Liu, W.-H. (2022). Exploring the gender gap in marine affairs in Taiwan. *Marine Policy*, Vol. 137. doi: 10.1016/j.marpol.2021.104937
38. MacNeil, A., Ghosh, S. (2017). Gender imbalance in the maritime industry: Impediments, initiatives and recommendations. *Australian Journal of Maritime and Ocean Affairs*, Vol. 9, Iss. 1, pp. 42-55, doi: 10.1080/18366503.2016.1271262
39. Maleki F., Stephens G.M. (2017). *A case study on gender gap in Massachusetts maritime academy*. ASEE Annual Conference & Exposition, Conference Proceedings, scopus: 2-s2.0-85030527380
40. Manesh, S.N., Choi, J.O., Shrestha, B.K., Lim, J., Shrestha, P.P. (2020). Spatial Analysis of the Gender Wage Gap in Architecture, Civil Engineering, and Construction Occupations in the United States. *Journal of Management in Engineering*, Vol. 36, Iss. 4, doi: 10.1061/(ASCE)ME.1943-5479.0000780
41. Mella, P. (2022). In every organization, gender stereotypes reduce organizational efficiency and waste productive energy: a systems thinking perspective. *Kybernetes*, Vol. 51, Iss. 13, pp. 156-185, doi: 10.1108/K-04-2021-0283
42. Miric, M., Yin, P.-L., Fehder, D.C. (2023). Population-Level Evidence of the Gender Gap in Technology Entrepreneurship. *Strategy Science*, Vol. 8, Iss. 1, pp. 62-84, doi: 10.1287/stsc.2022.0170
43. Murali, R., Rajasekar, D. (2018). A study on women employment in maritime industry in India. *International Journal of Mechanical and Production Engineering Research and Development, Special Iss.*, pp. 685-690.
44. Nastali, I., Bartlett, Ch. (2022). Women in Maritime Survey 2021. *IHS Markit Customer Care*.
45. Netchaeva, E., Sheppard, L.D., Balushkina, T. (2022). A meta-analytic review of the gender difference in leadership aspirations. *Journal of Vocational Behavior*, Vol. 137, doi: 10.1016/j.jvb.2022.103744
46. Olsen, K., LaGree, D. (2023). Taking action in the first five years to increase career equality: the impact of professional relationships on young women's advancement. *Gender in Management*, Vol. 38, Iss. 7, pp. 925-941, doi: 10.1108/GM-02-2022-0058
47. Ortega, O.D., Øvergård, K.I., & Henden, V. (2015). Women Are Better Leaders Than They Think: Gender Differences in the Self-Assessment of Leadership Skills in the Maritime Industry, In: M. Kitada, E. Williams, L. Froholdt, (Eds.) *Maritime women: Global leadership* (pp. 201-216). Berlin/Heidelberg: Springer, doi: 10.1007/978-3-662-45385-8\_15
48. Ozdemir, P., Albayrak, T. (2018). *Barriers to women's leadership in maritime and the ways to overcome them*. 19th Annual General Assembly (AGA) of the International Association of Maritime Universities (IAMU), pp. 305-313.
49. Pike, K., Wadsworth, E., Honebon, S., Broadhurst, E., Zhao, M., Zhang, P. (2021). Gender in the maritime space: How can the experiences of women seafarers working in the

- UK shipping industry be improved? *Journal of Navigation*, Vol. 74, Iss. 6, pp. 1238-1251, doi: 10.1017/S0373463321000473
50. Riaño-Casallas, M., Rojas-Berrío, S. (2023). How to Report Systematic Literature Reviews in Management Using SyReMa. *Innovar*, Vol. 34, Iss. 92, doi: 10.15446/innovar.v34n92.99156
51. *Rocznik Statystyczny Gospodarki Morskiej 2004-2022*. Główny Urząd Statystyczny, Retrieved from: stat.gov.pl, 5.06.2024.
52. Rönnlund, M., Tollefsen, A. (2023). Girls' school-to-work transitions into male dominated workplaces. *Journal of Vocational Education and Training*, doi: 10.1080/13636820.2023.2258527
53. Rubenstein, K., Young, K.G. (2016). *The public law of gender: From the local to the global*. Cambridge: Cambridge University Press.
54. Sauer, P.C., Seuring, S. (2023). How to conduct systematic literature reviews in management research: a guide in 6 steps and 14 decisions. *Review of Managerial Science*, Vol. 17, pp. 1899-1933, doi: 10.1007/s11846-023-00668-3
55. Segovia-Pérez, M., Castro Núñez, R.B., Santero Sánchez, R., Laguna Sánchez, P. (2020). Being a woman in an ICT job: an analysis of the gender pay gap and discrimination in Spain. *New Technology, Work and Employment*, Vol. 35, Iss. 1, pp. 20-39, doi: 10.1111/ntwe.12145
56. Şenbursa, N., Ozdemir, P. (2020). Raising Awareness About Women in Turkish Maritime Industry. *Journal of Eta Maritime Science*, Vol. 8, Iss. 3, pp. 194-209, doi: 10.5505/jems.2020.41275
57. Shemiakin, O., Krestovska, N., Torskiy, V., Ivanova, A., Kostyria, O. (2024). Legal Principles and Guarantees of Realisation of Gender Equality in the Labour and Social Sphere. *TransNav*, Vol. 18, Iss. 1, pp. 145-150, doi: 10.12716/1001.18.01.14
58. Smith, B. (2014). How might information bolster anti-discrimination laws to promote more family-friendly workplaces? *Journal of Industrial Relations*, Vol. 56, Iss. 4, pp. 547-565, doi: 10.1177/0022185614540128
59. Smith, N.E., Chowdhury, S., Costello, S.B. (2023). Examining the Effectiveness of Gender Equity Initiatives to Support Women in Engineering. *Journal of Management in Engineering*, Vol. 39, Iss. 2, doi: 10.1061/JMENEA.MEENG-5014
60. Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, Vol. 104, pp. 333-339, doi: 10.1016/j.jbusres.2019.07.039
61. Szozda, Z., Czyżowicz, D., Kałkowska, E., Raciborska, P., Raczkowska, J., Skowronek, M. (2014). Female students' perspective for maritime career. *Zeszyty Naukowe*, No. 40(112). Akademia Morska w Szczecinie, pp. 105-112.

62. Tang, L. (2023). Achieving gender equality in seafaring: an analysis of stakeholders' suggestions. *Maritime Business Review*, Vol. 8, Iss. 3, pp. 255-268, doi :10.1108/MABR-08-2022-0042
63. Tunji-Olayeni, P.F., Omuh, I.O., Amusan, L.M., Afolabi, A.O., Ojelabi, R.A., Ogundipe, K.E. (2017). Ttracting and retaining female students in construction related programs. *Turkish Online Journal of Educational Technology, Special Iss. October*, pp. 425-430.
64. Vo, L.C., Lavissière, M.C., Lavissière, A. (2023). Retaining talent in the maritime sector by creating a work-family balance logic: implications from women managers navigating work and family. *International Journal of Physical Distribution and Logistics Management*, Vol. 53, Iss. 1, pp. 133-155, doi: 10.1108/IJPDLM-09-2021-0409
65. Wade, L. (2024). Underwriting Empire: Marine Insurance and Female Agency in the French Atlantic World. *Enterprise and Society*, Vol. 25, Iss. 1, pp. 184-212, doi: 10.1017/eso.2022.33
66. Walters, K. (2018). *Hegemony in industrial design: A study of gendered communication styles*. Proceedings of the 20th International Conference on Engineering and Product Design Education, E and PDE 2018.
67. Wang, J.C., Markóczy, L., Sun, S.L., Peng, M.W. (2019). She'-E-O Compensation Gap: A Role Congruity View. *Journal of Business Ethics*, Vol. 159, Iss. 3, pp. 745-760, doi: 10.1007/s10551-018-3807-4
68. Yılmaz, H., Başar, E., Özdemir, Ü. (2015). Sample data from shipping companies: Women in the turkish seafarers registry and their employment situation. In: A. Weintrit, T. Neumann (Eds.), *Safety of Marine Transport: Marine Navigation and Safety of Sea Transportation* (pp. 13-20).

### Footnotes

1. Polish classification of activities are specified in brackets: A section: Agriculture, forestry and fishing (sea fishing); C section: Manufacturing (building of ships and floating structures; building of pleasure and sport boats, repair and maintenance of ships and boats, processing and preserving fish, crustaceans and molluscs), G section: Wholesale and retail trade; repair of motor vehicles including motorcycles (wholesale of other foods including fish, crustaceans and molluscs; retail sale of fish, crustaceans and molluscs in specialized stores), H section: Transport and storage (sea and coastal passenger and freight water transport, cargo handling, storage of goods in seaports, services supporting maritime transport, activity of maritime transport agencies), I section: Accommodation and food service activities (tourism and coastal area), L section: Real estate, renting and business activities (seaports' authorities), M section: Professional, scientific and technical activities (research and development for maritime economy purposes), N section: Administrative and supportive activities (waterborne transport equipment renting), O section: Public administration and national defense; compulsory social security (regulation of and contribution to more efficient operation of businesses), P section: Education (maritime).



## THE POSSIBILITIES OF USING THE VALUE THEORY TO ANALYSE AND EXPLORE COMMITMENT IN THE CONTEXT OF TQM

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**Purpose:** The purpose of this paper is to identify the concept of analysing commitment in the context of TQM by means of the theory of organisational values.

**Design/methodology/approach:** The primary method applied was a literature review. It was conducted in accordance with a research methodology proposed by J.W. Creswell (2013). In the process of analysing the findings of the conducted study, the cause-and-effect concept was adopted. The authors identified the previously used methods and techniques of exploring commitment in TQM, as well as the values supporting TQM.

**Findings:** Employee commitment requires the co-existence of other values, primarily justice and trust. Values such as self-control, responsibility, independence, courage and initiative play an important role in achieving and sustaining commitment. By using self-control, assigning responsibility and encouraging initiative, TQM can naturally stimulate the development of commitment. The commitment of top management fulfils the motivational function. The existing system of organisational values can be used in practice to study commitment. In view of the established findings, it was concluded that research tools used to measure the level of commitment should include questions concerning specific values and factors influencing them.

**Research limitations/implications:** The adopted method of literature review is not a perfect way to obtain information. Previous studies were conducted in different organisations and in different cultures.

**Practical implications:** The results obtained can have practical applications in the processes of developing employee commitment surveys and questionnaires.

**Originality/value:** This paper is one of few publications discussing the possibilities of studying commitment based on the theory of organisational values.

**Keywords:** commitment, justice, trust, values, TQM.

**Category of the paper:** conceptual paper.

## 1. Introduction

The commitment of both employees and managers is ranked among the critical success factors of TQM, along with customer orientation, process improvement, human resource development and long-term thinking (Petry, 1992), qualitative analyses, supplier management, strategic planning, teamwork and benchmarking (Sila, 2003), as well as organisational culture and a physical environment that guarantees service quality (Kachwala et al., 2021).

The results of previous research on commitment within the context of TQM can be divided into two groups. The results in the first group point to management and employee commitment as a key success factor in quality improvement (Petry, 1992; Oakland 1995; Kassicieh, Yourstone, 1998; Sila, Ebrahimpour, 2003; Soltani et al., 2005; Tonjang, Thawesaengskulthai, 2020; Kachwala et al., 2021). Organisations with high levels of this commitment achieve better results in the implementation of the principles of TQM (Soltani, Lai, Gharneh, 2005) and six sigma (Pradhan et al., 2021). Commitment is supposed to lead to the removal of barriers on the way to success (Goh, 2015). The other group contains results indicating factors that influence commitment (Bou, Beltrán, 2005; Soltani et al., 2005; Dubey et al., 2018). These factors include institutional pressures and the organisational values of trust and justice.

In research to date on the role and importance of commitment, a fundamental problem is that such research is often limited to asking respondents about their opinions on the importance of commitment. A better practice is providing respondents with behavioural manifestations (e.g. management sets goals, ensures their compliance with the corporate mission, etc.). It is too often tacitly assumed that survey participants know what commitment is. Meanwhile, it is a very complex concept with many dimensions and types. This raises the question of whether such surveys allow for capturing the essence of commitment and whether respondents are precisely aware of which type of commitment they are supposed to evaluate.

There is no doubt that the involvement of employees as well as management is important for the implementation of TQM principles. Despite various research approaches and types of commitment, there is a general belief that commitment can be regarded as a category of organisational values. There are many theories of ethical, economic, psychological and other values. For the purposes of this paper, it has been assumed that values comprise everything that is desirable. These are both target states (e.g. quality) and desired modes of behaviour (cf. Rokeach, 1968). In this study, the authors use a theory of values proposed by L. Krzyżanowski (1994), in which commitment together with justice and trust form a certain system of mutually dependent values. Therefore, the purpose of this paper is to present the concept of analysing and studying commitment in TQM based on the theory of organisational values. In order to achieve this objective, the authors have identified the existing methods, approaches and instruments used in research on ethical and autotelic values with regard to TQM.

Taking into account the existing publication gap, the following research questions have been posed:

1. Which values are important for the development of employee commitment in TQM?
2. How can the existing system of organisational values be used in practice to explore the issue of commitment?
3. To what extent do the characteristics of TQM determine the commitment of employees to quality improvement?

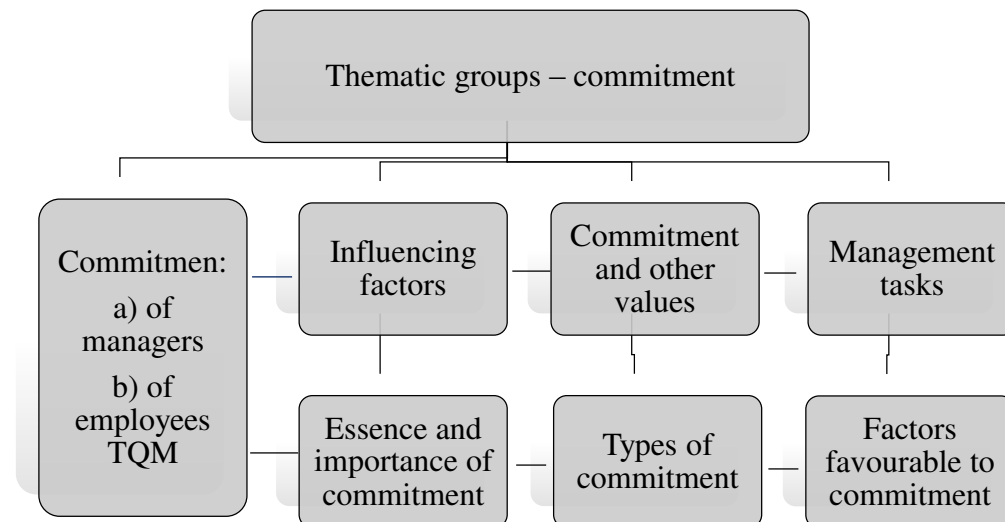
## 2. Method

A literature review was carried out to determine the state of the research on the subject. It was conducted in accordance with a research methodology proposed by J.W. Creswell (2013). The applied procedure also followed the principles of research conducted in the areas of management and business (Easterby-Smith et al., 2015). The review comprised selected academic research publication databases (Academic Search Ultimate, Business Source Ultimate, Education Resources Information Center, AGRICOLA, Open Dissertations, Green FILE and Eric). The review consisted of the following stages: (a) a general survey of publications on commitment; (b) a selection of keywords such as commitment, research method, TQM, management tasks; (c) a search for papers containing the selected keywords in the following databases: Academic Search Ultimate, including Business Source Ultimate, AGRICOLA, Open Dissertations, Green FILE, Newspaper Source, ERIC; (d) a reading of the selected publications (abstracts and, subsequently, whole texts); (e) a further selection of the publications with respect to the adopted research assumptions and objectives; (f) an arrangement and organisation of the publication content.

The logical course of the conducted review is illustrated in the diagram below (Figure 1).

In a general sense, commitment is defined as an employee's relative willingness to engage in continuous improvement and put effort into work that benefits customers (Peccei, Rosenthal, 1997). Commitment can take the form of beliefs expressed by top managers, as well as their participation in the fulfilment of specific tasks (Liang et al., 2007).

In the literature on the subject, there are relatively many different typologies of employee commitment and, consequently, quite a few different definitions of this concept. Typologies of commitment were proposed, among others, by Mayer and Schoorman (1998), Witt, Kacmar, Andrews (2001) and Bragg (2002). The most frequently mentioned types of commitment include: affective and continuance, aimed at remaining in the organisation, organisational, work-oriented, supervisory, "have-", "want-" or "should-type", affective and normative, calculative and behavioural.



**Figure 1.** The essence and definitions of commitment.

Source: own elaboration.

The differences between the particular types of commitment determine the course of research processes. For example, organisational commitment is defined as the relative strength of an individual's identification with and commitment to a particular organisation. It can manifest itself in a strong belief in the unconditional acceptance of the organisation's goals and values, a willingness to make significant effort for the benefit of an organisation or a strong desire to maintain membership in an organisation (Mowday et al., 1979; Luo, Qiao, 2020). Such a definition is close to the definition of affective commitment, which means "an employee's emotional attachment to an organisation. This commitment reflects the extent to which an individual wants to be in an organisation" (Spik, Klincewicz, 2008, p. 476).

Even within the particular types of commitment, different definitional approaches can also be found. Let us consider normative commitment. Reviewing various definitions, J.P. Meyer and N.M. Parfyonova (2010) note that over many years there have been different views on defining commitment. The term means a commitment to norms, values and internal beliefs that morally oblige an individual; a totality of internalised normative pressures to act in a way that meets the goals and interests of an organisation; a stabilising force that acts to maintain the direction of behaviour when conditions of expectation/equality are not met; an assumed obligation to follow a particular path of action in pursuit of established objectives.

Continuance commitment, on the other hand, is associated with employees perceiving a potential loss of organisational membership as very costly (Aziz et al., 2021), which may be due to either economic or social calculations.

Commitment is thus a complex construct, studied from a variety of perspectives and, consequently, rather difficult to conceptualise (Allen, 2016).

### 3. Commitment in research on TQM

In quality management, it has been accepted that commitment consists in assuming responsibility for processes put in place and is a crucial factor in moving from the stage of “business as usual” to the stage of “total quality” (Kanji, Asher, 1993, p. 36). The most common distinction is made between management commitment (cf. Sila, Ebrahimpour, 2003), and employee commitment. The latter is defined as “a positive, fulfilling, and work-related state of mind that is characterised by vigour, dedication, and absorption” (Schaufeli et al., 2002, p. 465).

Various publications dealing strictly with TQM contain theoretical sections focused on the importance of having all employees committed to their work and organisation. It was already Deming, Juran and Crosby who promoted the need for employee commitment to quality improvement processes. Most authors of classic works on quality management also emphasise the importance of continuous employee commitment in quality improvement (cf. Dale, 1999). It is assumed that commitment should lead to the practical utilisation of each employee’s ideas, experience and knowledge (Oakland, 1995).

Studies on commitment (cf. Oruma et al., 2014; Dubey et al., 2018; Campos et al., 2022) describe behavioural manifestations of commitment (e.g. setting of realistic quality goals, proper planning on quality management and creating quality management structures, staff education). Such an approach stemmed from the belief that TQM was a process requiring training, motivation, establishment of goals and directions for change, etc. Therefore, commitment was studied as an important factor in the success of TQM implementation and its absence was considered a barrier to this process (e.g. Soltani et al., 2005; Suleman, Gul, 2015).

Researchers also studied distinct types of commitment, such as affective commitment (Arunachalam, Palanichamy, 2017; Haffar et al., 2023), treating it as a category of a psychological state reflecting employees’ positive relationship with their organisation and causing them to want to stay with the same organisation (Alzoubi et al., 2023). Three different dimensions of commitment (affective, continuance and normative) (cf. Mendes et al., 2014) were used.

A significant proportion of the papers do not provide a definition of commitment or discuss the essence and significance of commitment in the theoretical section.

#### 3.1. Methods of conducting research on commitment

Questionnaire-based, quantitative research is one of the most popular methods. Time-lagged surveys (Dong et al., 2023) are also an increasingly common approach, especially in studies focused on organisational behaviour.

Various questionnaires are used. One of these is the Organisational Commitment Questionnaire (Porter, Smith, 1970), which is meant to measure affective commitment (Kanning, Hill, 2013). Some studies use the three-factor organisational commitment scale comprising affective commitment, normative commitment and continuance commitment and proposed by Allen and Meyer (cf. Meyer, Allen, 1991). As in other studies, meta-analyses are used (cf. Cilek, 2019).

Sometimes commitment is studied by means of observations, for example within the scope of work performed by students who write their graduation theses and dissertations (cf. Kubieniec, 2020).

### 3.2. Methods for measuring commitment in TQM

Previous research on the role and importance of commitment in TQM has mainly used quantitative questionnaire methods (cf. Mendes et al., 2014; Ismail, 2014; Suleman, Gul, 2015; Dubey et al., 2018; Hwang et al., 2020).

In some cases, the results of quantitative research have been enriched with qualitative suggestions (Chiarini et al., 2021; Kachwala et al., 2021). In very few cases, experimental (quasi-experimental) methods (Alzoubi et al., 2023) and the Delphi method (Chiarini et al., 2021) were applied. Still another research approach involved detailed and systematic literature reviews (cf. Kulenović et al., 2021; Ali, Johl, 2021; Zhang et al., 2021).

The table below describes the methods used to research commitment and presented in the scientific literature regarding TQM.

**Table 1.**

*The methods for studying commitment within the context of TQM - selected examples*

| Authors              | Participants, instrument   | Research objectives   | Definitions and dimensions of commitment  | Results  |
|----------------------|--|---|---|--|
| Mendes et al. (2014) | A questionnaire targeting 82 academic researchers. Organisational commitment was operationalised by means of a nine-point scale developed by Cook and Wall (1980). | Exploring whether the adoption of TQM principles is associated with employees' more favourable attitudes regarding organisational commitment and citizenship behaviour. | Three different dimensions were used in the theoretical description: affective commitment, continuance commitment and normative commitment. | The results supported the thesis that the adoption of TQM principles positively correlates with employees' more favourable attitudes towards organisational commitment and organisational citizenship behaviour. |

Cont. table 1.

|                                    |   |  |  |   |
|------------------------------------|---|--|--|---|
| Ismail (2014)                      | A questionnaire sent to 691 teachers from 24 secondary schools (a five-point Likert scale). The questionnaire on TQM practices consisted of five elements: top management commitment; continuous improvement; customer orientation; personnel commitment; as well as training and education (Ismail, 2014). | An attempt to determine whether the dimensions of TQM practices are predictors of a school climate.                                    | Commitment was one of the dimensions of TQM.   | Personnel commitment, top management commitment and continuous improvement were the main predictors of a school climate. Top management commitment is the most important factor which contributes to the success of TQM practices in an organisation. |
| Oruma et al. (2014)                | Questionnaires and structured questionnaires involving the participation of over 15 construction companies.   | Identifying factors influencing the implementation of TQM in the construction industry.  | The theoretical section describes the behavioural manifestations of commitment (e.g. setting realistic quality goals, properly planning quality management and developing a quality management structure create quality awareness and improve implementation of quality management systems). | The commitment of top management is a critical factor influencing the implementation of TQM in construction companies.  |
| Suleman and Gul (2015)             | A descriptive survey design was used, and a semi-structured questionnaire developed by the authors was used to collect information from respondents. Feedback was obtained from 72 school principals and 894 teachers.  | An analysis of the challenges faced by public secondary schools in effectively implementing a comprehensive quality management system. | It was found that management commitment is important and contributes to meeting targets and achieving results, while a lack of commitment is a barrier to TQM implementation.  | Besides other factors, a lack of management commitment is a barrier to TQM implementation.  |
| Arunachalam and Palanichamy (2017) | A questionnaire survey. 450 participants (shop floor employees of three Indian manufacturing organisations).  | Links between TQM and employee job satisfaction.   | Commitment was measured using a four-item scale. Management commitment as well as affective commitment were examined.  | The predictors of both job satisfaction and commitment were the same (except for the strength of prediction).   |

Cont. table 1.

|                     |  |  |  |  |
|---------------------|--|--|--|--|
| Dubey et al. (2018) | A survey of 300 senior quality managers representing 300 automotive component manufacturers. | It proposes a theoretical model rooted in institutional and upper echelon theories that explain TQM diffusion via top management commitment.     | The respondents were given a detailed description. Based on TQM principles, an assumption was made that commitment manifests itself in top management's formulating a strategy and sharing a TQM vision with everyone. | The findings indicate that institutional pressures significantly influence top management commitment in TQM. Subsequently, top management commitment influences the organisational diffusion of TQM through its acceptance, routinisation and assimilation.  |
| Krajcsák (2019)     | Two case studies.  | Identifying motivational strategies that enable the implementation of total quality management and showing how they support employee commitment. | Normative and affective commitment was explored.   | A TQM implementation project is not successful, the efforts to increase commitment are also likely to have a cultural impact. Extrinsic motivation plays a role in reinforcing normative commitment in the form of a sense of indebtedness. Intrinsic motivation promotes high levels of normative commitment as a moral obligation, as well as high levels of affective commitment. |
| Hwang et al. (2020) | 8,417 survey responses collected from a large-sized IT service company in South Korea.       | Understanding the effects that soft TQM practices have on employees.   | Organisational commitment was examined.  | The results show that the soft TQM practices enhance employees' readiness for change, thereby increasing their organisational commitment and reducing their turnover intention.  |



Cont. table 1.

|                                       |   |  |  |  |
|---------------------------------------|---|--|--|--|
| Abimbola et al. (2020)                | A questionnaire survey with a random selection of 350 respondents from a population of 11 faculties of a university with 2047 employees. The data used in this paper were obtained from a systematic review of the relevant literature. | The relationship between total quality management, employee commitment and competitive advantage in higher education institutions. | Employee commitment is an employee's attachment to their organisation.   | A proper implementation of TQM practices combined with employee commitment will guarantee results in the form of competitive advantage measured in terms of growing revenue, customer satisfaction and employee satisfaction.                    |
| Al-Maamari and Raju (2020)            | 360 workers (with a strong return of 60%) in Yemeni Oil Units.  | The effects of employees' organisational commitment on TQM implementation.   | The dimensions of organisational commitment were adapted from Herscovitch and Meyer's (2002) tool used to calculate the basis of three dimensions: affective, normative and continuous commitment. Their measurements consisted of 18 items. The concept of organisational commitment was defined by means of quotation from other publications. | The organisational commitment of employees is crucial for the implementation of TQM.   |
| Tonjang and Thawesaengskulthai (2020) | A systematic literature review (covering the period 1985-2019) divided into three stages: planning the review, conducting the review, reporting and disseminating the results.  | Identifying the drivers of innovation.   | Management commitment as one aspect of TQM.  | The review identified the following six aspects of TQM and innovation management in healthcare: top management commitment, customer focus, continuous improvement, employee commitment, information and analysis, as well as process management. |

Cont. table 1.

|                        |  |  |  |   |
|------------------------|--|--|--|---|
| Kachwala et al. (2021) | An extensive literature survey and a questionnaire with positive statements. The respondents were hotel managers. In addition, interviews or telephone conversations/discussions were used. The questionnaire was sent to 186 people. A total of 142 responses were received, with a response rate of 76%. | Identifying the key dimensions of TQM that affect the overall quality of the hotel industry.                       | An operational definition of research variables and hypotheses. Top management commitment consists in providing support for employees' efforts aimed at continuous improvement. Employees are encouraged to solve problems.                            | The overall quality of the hotel sector is influenced by: 1) top management commitment, 2) organisational culture, 3) continuous improvement, and 4) service landscapes (physical environment and facilities).  |
| Chiarini et al. (2021) | The Delphi method was used in the study. A semi-structured questionnaire was administered to eleven experts to collect their opinions and suggestions. The quantitative results were supplemented with qualitative suggestions.  | Identifying factors important for improving quality in small and medium-sized enterprises through internal audits. | Managers should be directly involved in internal audit procedures.   | Management commitment is an important factor in quality improvement alongside audits and improvement initiatives (e.g. Lean tools). Top management commitment has a twofold positive impact: first, it motivates employees to achieve established goals and KPIs; second, it focuses on the importance of controlling and monitoring such goals and KPIs. |
| Ali and Johl (2021)    | A review of the literature on TQM from an objective (soft) and subjective (hard) perspective. A total of 87 empirical studies from the years 1987-2019 were analysed.  | Examining the present literature on TQM and its connection with industry 4.0.                                      | Commitment as relevance and support for Quality 4.0; unity of quality objectives 4.0; acceptance of new technologies. In the traditional view: commitment, support for quality planning and execution, unity of purpose to achieve quality objectives. | Soft dimensions for the effective implementation of Quality 4.0 in business include top management commitment, customer focus, training and learning, as well as quality of big data and analysis.  |

Cont. table 1.

|                          |  |   |   |  |
|--------------------------|--|---|---|--|
| Zhang et al. (2021)      | A bibliometric analysis of the existing literature on TQM in service enterprises collected from the Web of Science and Scopus databases.   | Highlighting the major domains of and address the most prominent topics in the Total Quality Management field in the service sector.  | Both management commitment and organisation-wide commitment were included in the analysis.  | Top management commitment is a critical construct and managers should be aware of obstacles caused by its absence.   |
| Kulenović et al. (2021)  | A systematic literature review in three main stages (13 empirical papers published between 1995 and 2017): formulation of a problem to be solved by a systematic literature review; definition of criteria for inclusion and exclusion of papers; and search for and selection of papers. The selected papers were published in JCR (Journal Citation Reports of Thomson Reuters) and SJR (SCImago Journal and Country Rank by Scopus) journals. | Identifying the most important factors related to the successful implementation of TQM.   | A compilation of other studies on commitment (initiative, support for individuals, communication of information, alignment of objectives with a vision).  | Management commitment is a critical factor in TQM, alongside customer focus, training, procurement management, information and analysis, and process management. |
| Al-Maamari et al. (2021) | The survey was conducted on a sample of 360 employees of Yemen Oil Units selected using stratified random sampling methods. Data from completed questionnaires, which had a return rate of 60%, were subjected to structural equation modelling analysis.  | Determining how Total Quality Management practices have an impact on individual readiness for change.   | The study analysed organisational commitment as a mediator through which comprehensive quality management enhances individual readiness for change.   | TQM practices foster organisational commitment and readiness for change.   |
| Campos et al. (2022)     | Data and evidence were collected by means of an online survey questionnaire completed by 32 employees. Interviews were conducted with senior managers to obtain further information.   | Assessing how an enterprise's commitment to quality could be described in terms of willingness, involvement in quality matters and also to identify difficulties encountered by management and employees. | Commitment defined by behavioural traits. Senior executives act on suggestions how to improve the quality of services. The top management is seen by all as actively promoting quality within the company. Staff is given education and training in how to identify and act on quality and improvement opportunities. | Commitment to quality has a positive impact on the implementation of TQM. The more committed and willing employees are, the easier it is to implement TQM.       |

Cont. table 1.

|                       |   |   |   |  |
|-----------------------|---|---|---|--|
| Alzoubi et al. (2023) | A quasi-experimental multiple time series were conducted, starting in September 2017 and ending in June 2018. A sample of 140 nurses was selected using a stratified proportional random sampling technique. A total of 132 participants completed the study, 67 from the intervention group and 65 from the control group. | Assessing the impact of a comprehensive quality management intervention on the job performance and commitment of nurses working in state hospitals. | Commitment was treated as a psychological state reflecting nurses' positive relationship with a hospital, causing them to want to stay in the same organisation. A scale of 18 items was used to assess commitment. Affective commitment, continuance commitment and normative commitment are the 3 sub-fields of measuring nurse commitment. | There were no significant differences in work performance or commitment between the intervention group and the control group. The educational intervention was effective in improving the work performance of the nurses in the intervention group. The greater commitment of the respondents in the intervention group was attributed to improved work performance. |
| Haffar et al. (2023)  | The survey was conducted on a sample of 360 employees of Yemen Oil Units (YOU), selected using stratified random sampling methods. Data from completed questionnaires, which had a return rate of 60%, were subjected to structural equation modelling (SEM) analysis.  | Assessing the impact of comprehensive quality management practices on individual readiness for change.  | The subject of the study was affective commitment as discussed in the theoretical section.  | TQM practices were linked to an increase in organisational commitment.   |

Source: own elaboration based on a review of the literature indicated in the table (2014-2023).

## 4. A system of values in TQM

### 4.1. Commitment and other values

There is a significant positive relationship between the dimensions of TQM, procedural justice and affective commitment (Golparvar, Oreizie, 2009). Affective commitment fully mediates the effects of TQM and justice on intention to remain an employee (Brooks, Zeitz, 1999). Commitment to organisational change, and this is sometimes the case at the beginning of a TQM implementation process, requires organisational justice. Organisational justice is strongly related to commitment to organisational change, with the strongest relations being between procedural justice and affective commitment to change. Furthermore, resistance to change does not significantly correlate with justice or commitment to change (Foster, 2010).

Only distributive justice predicts organisational commitment among victims of downsizing, while procedural justice is a stronger predictor among survivors of downsizing and unaffected employees (Clay-Warner et al., 2005). Organisational justice has been identified as an important contributor to employee commitment to an organisation (Rahman et al., 2016). In other studies, both distributive justice and procedural justice have been shown to cause an increase in organisational commitment. And procedural justice has resulted in an increase in the value of public services (Jang et al., 2021).

There is a consensus that TQM requires not only commitment, but also that commitment be based on trust in others (Coyle-Shapiro, Morrow, 2003). Teamwork, organisational communication and organisational trust are positively associated with affective commitment (Boon et al., 2006). The level of trust in superiors influences the level of employee commitment (Michaeli et al., 2009). Both values are extremely important for knowledge sharing processes (Hashim, Tan, 2015).

#### **4.2. Relationships between other values**

Justice is regarded as a superior value and therefore, it constitutes a basis for trust. Organisational justice positively influences trust regardless of cultural background. This has been confirmed by studies conducted in the USA, China, Germany and India (Pillai et al., 2001).

At the same time, however, managerial trust, by influencing interactional justice, has a significant impact on employee behaviour and performance (Aryee et al., 2002). According to Kickull, Gundryn and Posig (2005), however, the strongest value is trust. When trust is low, the need for justice increases. Employees feel that the organisation does not respect their values and treats them unfairly. Trust influences the assessment of justice. It has a greater impact on interactional justice than on distributive and procedural justice (Stinglhamber et al., 2006).

Research shows that commitment can be a source of trust and, vice versa, trust in an organisation may positively influence commitment and performance (Tan, Lim, 2009). Bou and Beltrán (2005) have found that TQM influences employee attitudes manifested in trust, participation and commitment. These attitudes must be reinforced by the commitment of top management (Bou, Beltrán, 2005). Commitment can lead to trust and both values are indispensable for effective cooperation (Walton et al., 2008).

Job satisfaction largely depends on distributive justice (Kumar et al., 2009). Leaders' commitment and the resulting satisfaction does not always trigger employees' satisfaction, but can foster temporary commitment (Bugdol, 2010). Solidarity fosters employees' collective effort (cf. Richardson, 2008) and can therefore be an important value in quality improvement processes. Solidarity requires trust (Myers, Johnson, 2004). Solidarity among employees generates high levels of job satisfaction (Hodson, 1997).

Organisational values are essential for instrumental values. For example, responsibility requires trust (Ammeter et al., 2004). For employees, self-control is impossible without trust.

Independence comes with job satisfaction, innovative solutions, improved performance, self-determination as well as a sense of ownership and responsibility (Tingo, Mseti, 2022). Highly independent employees prefer to be assigned to meaningful tasks on which they can demonstrate their creativity and use initiative. They become satisfied when they are offered decision making freedom and job enrichment (Cromie, 2000).

#### 4.3. Commitment as an organisational value in TQM

To put it simply, similarly to affective commitment, commitment to quality improvement is dependent on the ethical values of TQM (integrity, fairness, respect). Ethical values are the foundation of organisational values. Distributive, procedural, but also interactional justice influences trust and facilitates employee commitment to quality improvement and affective commitment. If commitment is appreciated and, at the same time, the soft elements of TQM are properly implemented (i.e. employees are adequately supported, trained and empowered), satisfaction can occur. At the same time, however, organisational values need the tools of instrumental values such as courage, self-control, independence and responsibility.

**Table 2.**

*The significance of values in TQM*

| Values                | Role in TQM   | Notes on TQM research  | Bad practice  |
|-----------------------|---|--|---|
| <b>Organisational</b> |   |  |   |
| Justice               | Organisational, procedural and distributive justice are essential for employee commitment to the implementation and maintenance of TQM (Brooks, Zeitz, 1999; Ali et al., 2020). In TQM, organisational justice is a predictor of improvement in work-related employee attitudes and quality-related performance (Durairatnam et al., 2019). | Impartiality and retributive justice have not been researched. | Use of employee rankings. A negative aspect of rankings is that they can encourage unethical behaviour whose objective is to improve one's own position relative to competitors (Piest, Schreck, 2021).<br>Lack of procedural justice. If procedural justice is not maintained, then quality objectives do not fulfil a motivational function (Bugdol, Jedynak, 2021).<br>Lack of respect for and appreciation of the efforts made by employees. It is important to remember that interpersonal justice is maintained when superiors treat employees "with respect and sensitivity and explain the rationale for decisions thoroughly" (Inoue et al., 2009).<br>Establishment of numerical targets only (E. Deming emphasised their destructive role). Bonuses dependent on collective effort.<br>Greed as the root cause of injustice (Wang, Murnighan, 2011). |

Cont. table 2.

|              |   |  |   |
|--------------|---|--|---|
| Trust        | The dominant component of TQM (Bugdol, 2013).<br>It contributes to employee commitment (Ray, 1994) and is important for customer satisfaction (Venkatakrisnan et al., 2023).  | While managers' behaviour matters, we know little about the other dimensions of trust (trustworthiness, reliability, competence, predictability, benevolence).<br>We know little about other types of trust (e.g. particularistic, altruistic, rational-collective). | Establishment of unrealistic objectives, failure to keep promises, lack of fairness (Bugdol, 2012).<br>Lack of reliability, dependability, predictability of behaviour.   |
| Commitment   | Management commitment is important in the implementation and subsequent maintenance of TQM (Petry, 1992; Oakland, 1995; Kassicieh, Yourstone, 1998; Sila, Ebrahimpour, 2003; Soltani et al., 2005; Goh, 2015, Tonjang, Thawesaengskulthai, 2020).   | There is a problem of anticipatory commitment (when commitment precedes trust and formal arrangements, it destroy the process of trust formation).   | Misallocation of resources, lack of reciprocity, unfair incentivisation and remuneration, excessive commitment related to the mutual licensing of unethical behaviours) (cf. Klotz, Bolino, 2013).<br>Lack of justice prevents the development of trust and inevitably leads to political behaviours within an organisation (Othman, 2008).<br>Violation of a psychological contract. Even when a psychological contract is being performed, but there is a low level of interactional justice, the level of commitment decreases, regardless of the level of procedural justice (Thompson, Bunderson, 2003). |
| Solidarity   | Solidarity and spirituality are values and features of TQM (Fort, 1995), as well as a condition for its success (Green, 2012).<br>Solidarity creates emotional trust that allows cooperation (Huy, 2000).<br>It is important for knowledge sharing processes (Werdiningsih, Pudjiarti, 2001). | So far, there is a lack of research on solidarity in the context of defending the interests of individual stakeholders (e.g. when their interests are threatened by unethical goals).  | Lack of a common purpose or interest, exclusion of groups or individuals. Mutual resentments and animosities (cf. Morgan, Pulignano, 2020).   |
| Satisfaction | It is key to ensuring better business operations and is important for customer satisfaction, especially in services (Kurdi et al., 2020).<br>Job satisfaction can be a source of commitment (Mo, Borbon, 2022).   |  | Lack of support, motivation (Varma, 2017).<br>Stress, poor communication (Hee et al., 2018).  |

Cont. table 2.

| <b>Instrumental</b> |  |   |  |
|---------------------|--|---|--|
| Responsibility      | TQM requires responsibility for overall processes (Kanji, Asher, 1993) and responsible autonomy based on self-control (Snape et al., 1995), as well as responsibility for one's own actions (Pankaj, Naman, Kunal, 2013). Employee accountability is inextricably linked to commitment and contributes to quality improvement (Liu, 2021). | An interesting issue is that of blurred responsibility (i.e. situations in which someone is formally responsible for something but does not feel so).   | Blurred responsibility. Lack of connection between responsibility and qualifications (cf. ISO 9001: 2015).<br>Lack of delegation of authority and responsibility (cf. Gul et al., 2012). Superiors' willingness to share power, allocate autonomy and responsibility may unintentionally increase unethical pro-organisational behaviour among employees. This occurs by intensifying their moral disengagement (Dennerlein, Kirkman, 2022). |
| Self-control        | TQM requires a shift from external control to self-control (Godfrey et al., 1997). It allows for a rapid location of defects (Lavy, 1994). It provides immediate feedback on quality problems, allowing them to be rectified quickly (De Ruyter, Cardew-Hall, Hodgson, 2002).  | Self-control is not only a form of work organisation, quality assurance, but whether an employee has the potential to quickly overcome a crisis or difficulty, has a sense of control (cf. Kim et al., 2018).                                 | Lack of knowledge of processes, quality requirements, inability to identify and monitor processes.<br>Lack of a sense of agency.<br>A system of progressive discipline that prevents employees from re-commitment (a system of discipline should assume that employees can exercise self-control and re-commitment) (Osigweh, Chimezie, Hutchison, 1989).  |
| Independence        | Employee autonomy can have a positive impact on employee performance (Tingo, Mseti, 2022).<br>Independence relates to the ways in which audits are carried out, which contributes to reinforcing the principles of TQM (Al Ghani, 2018).   | Independence should be considered from the point of view of different organisational structures and tasks performed.<br>In the case of audits, auditors' independence in the context of huge competition for clients is an interesting topic. | An overly strong functional division, derogatory, insulting supervision triggers counter-productive behaviour that manifests itself in acts of vandalism, increased staff mobility, and such behavioural manifestations are not good for quality (Wei, Si, 2013).  |
| Courage             | It is essential in the implementation of an organisation's strategic vision and is a way of stimulating employee initiative (Snyder, 2010), it can have an impact on all TQM principles (Moccia, 2016).  | An interesting research topic could be the perception of people who are courageous, who, while helping their leaders, take responsibility for their work themselves, without blindly following the leaders (Javaid et al., 2023).             | The main enemy is the fear of assessment and failure to achieve planned results (Deming, 1986).<br>Fear causes employees to stop communicating and not share their knowledge, which leads to serious problems in quality improvement and innovation (Gambarotto, Cammozzo, 2010).  |



Cont. table 2.

|          |  |   |   |
|----------|--|---|---|
| Activity | Activity is linked to employees' participation in training and teamwork (Kabak et al., 2014).<br>Active employee participation is a feature of TQM.<br>TQM requires that both individual employees and groups of employees be active (Krasachol, Tannock, 1999). | There is a lack of studies on the weaknesses of training and teamwork in TQM (which is due to the character of tasks and team building stages). | A lack of information about the state of pursued objectives and a lack of trust constitute serious barriers to employee activity (cf. Bou, Beltrán, 2005).<br>In the case of training courses, one barrier is a lack of support on the part of a supervisor and motivation to learn (Kim et al., 2020). |
|----------|--|---|---|

Source: own elaboration based on a review of the literature cited in the table (2014-2023).

## 5. Proposal for research on commitment

The conducted literature review shows that commitment is a complex construct. If we want to explore commitment in TQM, we should propose its precise definition.

If we refer to employee commitment to TQM, we can look at the term from the point of view of the theory of values and assume that commitment occurs when a community of values occurs (Affective commitment, 2001). Such a community of values is indispensable for the occurrence of appropriate forms of behaviour. These include: constantly striving to improve products through process improvement, actively participating in the implementation and setting of quality objectives, participating in quality team management reviews and quality improvement training, participating in processes aimed at providing support to other employees who request it. Firstly, we can establish whether such behaviour occurs, but the key issues will be those relating to other organisational values.

If, following philosophers, we assume that the basis of trust and, consequently, continuance commitment is justice, then we should ask employees about their subjective sense of justice, but at the same time explore the managerial factors constituting obstacles and barriers to justice. We know from research that trust is undermined by establishing unrealistic objectives and failing to deliver on promises (Bugdol, 2012, 2014), and if procedural justice is not maintained, quality goals do not fulfil a motivational function (Bugdol, Jedynek, 2021). Procedural justice ensures that employees participate in decision-making processes and have a real influence on their organisation's performance. Interpersonal justice, on the other hand, is maintained when superiors treat employees "with respect and sensitivity and explain the rationale for decisions thoroughly" (Inoue et al., 2009, p. 75).

When examining the drivers of commitment, we should, on a process audit basis, determine to what extent the allocation of resources is fair, how the remuneration system works (whether employees with the same qualifications and tasks receive similar or the same salaries), whether there is an excessive development of citizenship behaviour, how well the psychological contract is complied with.

As far as instrumental values are concerned, each of them needs to be properly diagnosed. For example, if we are examining the conditions conducive to self-control, it is important to establish whether employees have knowledge of the process approach and to what extent they are provided with opportunities to identify and monitor processes.

## 6. Characteristics of TQM and commitment

Most publications on the characteristics of TQM refer to not only commitment, but also leadership, empowerment, teamwork, customer orientation and process approach. The question arises: how do these basic characteristics of TQM determine employees' commitment to quality improvement?

**Table 3.**  
*Characteristics of TQM and commitment*

| Characteristics of TQM | Relevance to commitment  | Comments  |
|------------------------|--|---|
| Leadership             | Transactional leaders may engage employees, but they do not necessarily evoke passion. Transformational leaders focus on the achievement of goals – this is how they stimulate commitment. Charismatic leaders can trigger full commitment and additional effort (Yahaya, Ebrahim, 2016).  | Anticipatory commitment causes confusion, disorientation. High quality is sometimes achieved under immense pressure which intensifies fear (Bugdol, 2020).  |
| Empowerment            | There are positive relationships between structural empowerment and commitment (cf. Fragkos et al., 2020).   | Empowerment can evoke a fear of responsibility (Andrade et al., 2017), and thus prevent the development of commitment.  |
| Teamwork               | Teamwork and commitment are important elements of quality programmes (Heath, 1989).<br>Teamwork behaviours influence team commitment (Sheng et al., 2010).   | Lack of plans to carry out can undermine group work (Deming 1986).<br>Commitment depends on the types of tasks and the stage at which teams are put together. Employee commitment can depend on the support provided by management, individual commitment and the quality of a team leader (Mobolade, Akinade, 2021). |
| Customer orientation   | Authentic leadership can affect employees' customer orientation (Ribeiro et al., 2020).<br>Affective commitment acts as a mediator between abusive supervision and proactive customer service performance (Zang et al., 2021).<br>Honesty and humility influence a leadership style, which in turn positively influences salespersons' customer orientation and the quality of personal relationships (Kirkland et al., 2021). | An excessive customer orientation means that the needs and expectations of employees can become less relevant, which consequently prevents authentic and dedicated commitment.  |

Cont. table 3.

|                  |  |  |
|------------------|--|--|
| Process approach | Process improvement requires the commitment of all employees. If processes are improved on a continuous basis, commitment is maintained (Oakland, 1995). | A lack of appreciation for process improvement efforts results in demotivation and a decline in commitment (Lam et al., 2015). |
|------------------|--|--|

Source: own elaboration based on a review of the literature cited in the table (2014-2023).

## 7. Limitations

A literature review is not a perfect research method as it focuses on studies conducted in different cultures, organisations and using different research approaches.

There are many relationships and dependences between the different values that are not described in this paper. The adopted research approach is mainly suitable for large organisations.

## 8. Discussion and further research

Firstly, it should be noted that identifying simple cause and effect relationships can be an unreliable method. Organisational values can fulfil a modifying function or they can be the direct cause of the social processes taking place. Over time, it turns out that certain types of values have a greater impact on one value and others on another. For example, commitment requires trust and vice versa. Under certain conditions and situations, procedural justice influences employee commitment and distributive justice influences employee satisfaction (Kumar et al., 2009). Satisfaction is a stronger predictor of productivity than organisational commitment (Malik et al., 2010).

Secondly, the existing theoretical foundations showing the relations between TQM and ethical values and virtues (Moccia, 2016) can be used to develop different theoretical models. It is sufficient to refer to justice as a basis for trust and commitment. This value is also a virtue, whose importance was emphasised by Aristotle, Plato and Thomas Aquinas. But alongside justice, they also listed temperance, prudence and fortitude. New research approaches can be developed on this basis.

Thirdly, what is already a treasury of knowledge about commitment in TQM must not be discarded. After all, it is possible to use the various ideas concerning approaches to and factors of commitment contained in the research that has already been carried out. For example, it has so far been stressed that the level of commitment depends on institutional pressures (Dubey et al., 2018), appropriate human resource management practices (Bou, Beltrán, 2005), appropriate attitudes of managers (Soltani et al., 2005) and the orientation of efforts towards

achieving quality goals (Bou, Beltrán, 2005). Barriers preventing commitment have also been pointed out (Soltani et al., 2005). All these findings and identified factors can be linked to organisational values.

There exist numerous opportunities for conducting further research. The demonstrative and anticipatory types of commitment have so far attracted the attention of few researchers and appear to be particularly attractive topics. There is no unanimity of opinion on the nature of commitment. Some practitioners believe that demonstrative commitment is needed; others claim that commitment should be closely linked to the pursuit of established objectives and remuneration systems. In TQM, demonstrative commitment is needed, but a lot can depend on other variables such as cost assessment, the authority enjoyed by those demonstrating commitment or the existing level of trust.

In the case of anticipatory commitment, what is important is the knowledge of those responsible for the TQM implementation process and the level of their bond with the organisation. In summary, management commitment continues to be a fascinating research topic in the context of TQM.

When commitment precedes trust and formal agreements, it can undermine the process of trust formation. This is the case in commercial activities, but then the determining factor in the final assessment is how this commitment is perceived. Excessive commitment is suspicious and repulsive, which can cause counterparties to adopt defensive attitudes or to withdraw from cooperation.

Based on the conducted review, we formulate the following hypotheses:

H.1. The lower the level of justice, the higher the level of employee commitment.

In this case, interpersonal trust is an intervening variable.

H.2. The stronger the instrumental values are embraced and upheld, the higher the level of commitment.

In the latter case, each value should be measured separately.

## **9. Conclusion**

Employee commitment requires the coexistence of other values, primarily justice in its interactional, distributive, restorative and procedural variants. Interpersonal trust is needed. If these values are deeply embedded in the organisational culture, there is an appropriate level of employee satisfaction, which can be a prerequisite for customer satisfaction.

In TQM, instrumental values such as self-control, responsibility, independence, courage and initiative play an important role in sustaining and achieving commitment. This system is based on ethical values (honesty, respect, fairness, integrity), which are essential to achieving commitment.

The existing system of organisational values can be used in practice to study commitment. A research questionnaire may include questions on individual values and factors influencing them. Such factors can be divided into managerial (no rankings, a fair remuneration system, correct allocation of resources) and relational (managerial support, respect for others, fair treatment, etc.). The basic principles of TQM foster commitment, but much depends on other variables such as management styles, appreciation of employees' effort, involvement of others in teamwork and employees' ability to assume responsibility.

## References

1. Abimbola, B.O., Oyatoye, E.O., Oyenuga, O.G. (2020). Total quality management, employee commitment and competitive advantage in Nigerian tertiary institutions. A study of the University of Lagos. *International Journal of Production Management and Engineering*, 8(2), 87-98.
2. Al Ghani, A.N.J. (2018). The impact of auditor independence on total quality management. *Academy of Strategic Management Journal*, 17(6), 1-14.
3. Ali, A., Rehman, S., Asif, M., Iqbal, N. (2020). Effect of soft TQM practices on job satisfaction and organizational commitment of healthcare professionals. *International Journal of Management Research and Emerging Sciences*, 10(1), 56-66.
4. Ali, K., Johl, S.K. (2021). Soft and hard TQM practices: future research agenda for industry 4.0. *Total Quality Management & Business Excellence*, 33(13-14), 1-31. doi: 10.1080/14783363.2021.1985448.
5. Allen, N.J. (2016). Commitment as a multidimensional construct. In: J.P. Meyer (Ed.), *Handbook of employee commitment* (pp. 28-42). Cheltenham: Edward Elgar Publishing.
6. Al-Maamari, Q.A., Alkadash, T., Al-Absy, M.S., Nagi, M., Abdullah, M.A. (2021). The Mediation Impact Of Organizational Commitment On The Total Quality Management Practices And Individual Readiness For Tqm Implementation Within Yemeni Oil Units. *International Journal For Quality Research*, 15(2), 595-618.
7. Al-Maamari, Q.A., Raju, V. (2020). Does Organizational Commitment affect Individual Readiness for Total Quality Management (TQM) Implementation. *Test Engineering & Management*, 8672-8680.
8. Alzoubi, M.M., Ks, H., Am, R., Al-Zoubi, K.M., Al-Mugheed, K., Alsenany, S.A., Oweidat, I., Abdelallem, S.M. (2023). Effect of total quality management intervention on nurse commitment and nurse performance: A quasi-experimental study. *Medicine*, 102(40), e35390.

9. Ammeter, A.P., Douglas, C., Ferris, G.R., Goka, H. (2004). A social relationship conceptualization of trust and accountability in organizations. *Human Resource Management Review*, 14(1), 47-65.
10. Andrade, J., Mendes, L., Lourenço, L. (2017). Perceived psychological empowerment and total quality management-based quality management systems: an exploratory research. *Total Quality Management and Business Excellence*, 28(1/2), 76-87.
11. Arunachalam, T., Palanichamy, Y. (2017). Does the soft aspects of TQM influence job satisfaction and commitment? An empirical analysis. *The TQM Journal*, 29(2), 385-402.
12. Aryee, S., Budhwar, P.S., Zhen, X.C. (2002). Trust as a mediator of the relationship between organizational justice and work outcomes: test of a social exchange model. *Journal of Organizational Behavior*, 23, 267-286.
13. Aziz, H.M., Othman, B.J., Gardi, B., Ahmed, S.A., Sabir, B.Y., Ismael, N.B., Hamza, P.A., Sorguli, S., Ali, B.J., Anwar, G. (2021). Employee Commitment: The Relationship between Employee Commitment And Job Satisfaction. *Journal of Humanities and Education Development*, 3(3), 54-66.
14. Boon, O.K., Safa, M.S., Arumugam, V. (2006). TQM practices and affective commitment: a case of Malaysian semiconductor packaging organizations. *International Journal of Management and Entrepreneurship*, 1(2), 37-55.
15. Bou, J.C., Beltrán, I. (2005). Total Quality Management, High-commitment Human Resource Strategy and Firm Performance: An Empirical Study. *Total Quality Management & Business Excellence*, 16(1), 71-86.
16. Bragg, T. (2002). Improve Employee Commitment. *Industrial Management*, 44(4), 18-21.
17. Brooks, A., Zeitz, G. (1999). The effects of total quality management and perceived justice on organizational commitment of hospital nursing staff. *Journal of Quality Management*, 4(1), 69-93.
18. Bugdol, M. (2010). *Wymiary i problemy zarządzania organizacją opartą na zaufaniu*. Kraków: Wydawnictwo UJ.
19. Bugdol, M. (2012). Wrogowie zaufania w zarządzaniu jakością. *Problemy Jakości*, 44(9), 2-5.
20. Bugdol, M. (2013). Selected proposals and possibilities of trust development within the TQM concept. *The TQM Journal*, 25(1), 75-88.
21. Bugdol, M. (2014). *Znaczenie sprawiedliwości w zarządzaniu ludźmi: dlaczego warto być sprawiedliwym*. Kraków: Wydawnictwo UJ.
22. Bugdol, M. (2020). The problem of fear in TQM – causes, consequences and reduction methods – a literature review. *The TQM Journal*, 32(6), 1217-1239. doi:10.1108/TQM-02-2019-0047.
23. Bugdol, M., Jedynek, P. (2021). Quality objectives in management systems—their attributes, establishment and motivational function. *International Journal of Quality & Reliability Management*, 39(1), 115-136.

24. Campos, N.J.F., De Vera, A.A.A., Gonzales, E.J.M., Guevarra, J.M.A., Ubaldo, N.L., Vigonte, F.G. (2022). The Impact of Quality Commitment on the Implementation of TQM in Hensa 168 Rubber Corporation. *IUP Journal of Operations Management*, 21(1), 43-58.
25. Chiarini, A., Castellani, P., Rossato, C., Cobelli, N. (2020). Quality management internal auditing in small and medium-sized companies: an exploratory study on factors for significantly improving quality performance. *Total Quality Management & Business Excellence*, 32(15-16), 1829-1849. doi:10.1080/14783363.2020.1776101.
26. Cilek, A. (2019). The Effect of Leadership on Organisational Commitment: A Meta-Analysis. *Cypriot Journal of Educational Sciences*, 14(4), 554-564.
27. Clay-Warner, J., Hegtvedt, K.A., Roman, P. (2005). Procedural justice, distributive justice: How experiences with downsizing condition their impact on organizational commitment. *Social Psychology Quarterly*, 68(1), 89-102.
28. Cook, J., Wall, T. (1980). New Work Attitude Measures of Trust, Organizational Commitment and Personal Need Non-Fulfillment. *Journal of Occupational Psychology*, 53(1), 39-52.
29. Coyle-Shapiro, J.A., Morrow, P.C. (2003). The role of individual differences in employee adoption of TQM orientation. *Journal of Vocational Behavior*, 62(2), 320-340.
30. Creswell, J.W. (2013). *Projektowanie badań naukowych*. Kraków: Wydawnictwo UJ.
31. Cromie, S. (2000). Assessing entrepreneurial inclinations: Some approaches and empirical evidence. *European Journal of Work and Organizational Psychology*, 9(1), 7-30. doi:10.1080/135943200398030.
32. Dale, B.G. (1999). *Managing Quality*. London: Blackwell Business.
33. De Ruyter, A.S., Cardew-Hall, M.J., Hodgson, P.D. (2002). Estimating quality costs in an automotive stamping plant through the use of simulation. *International Journal of Production Research*, 40(15), 3835-3848.
34. Deming, W. E. (1986). *Out of the crisis*. Cambridge: MIT Center for Advanced Engineering Study.
35. Dennerlein, T., Kirkman, B.L. (2022). The hidden dark side of empowering leadership: The moderating role of hindrance stressors in explaining when empowering employees can promote moral disengagement and unethical pro-organizational behavior. *Journal of Applied Psychology*, 107(12), 2220-2242. doi:10.1037/apl0001013.
36. Dong, R., Yu, W., Ni, S., Hu, Q. (2023). Ageism and employee silence: the serial mediating roles of work alienation and organizational commitment. *Ethics & Behavior*, 33(8), 702-721. doi:10.1080/10508422.2022.2126843.
37. Dubey, R., Gunasekaran, A., Childe, S.J., Papadopoulos, T., Hazen, B.T., Roubaud, D. (2017). Examining top management commitment to TQM diffusion using institutional and upper echelon theories. *International Journal of Production Research*, 56(8), 2988-3006. doi:10.1080/00207543.2017.1394590.

38. Durairatnam, S., Chong, S.C., Jusoh, M. (2019). People-related TQM practices, organisational culture, organisational justice and employee work-related attitudes for quality performance: a research agenda. *Global Journal of Management and Business Research*, 19(4), 1-10.
39. Easterby-Smith, M., Thorpe, R., Jackson, P. (2015). *Management and business research*. Los Angeles-Singapore: Sage.
40. Effective commitment. (2001). *A Dictionary of Human Resource Management*. Oxford/New York: Oxford University Press.
41. Faeq, D.K., Ali, B.J., Akoi, S. (2022). The Impact of People Related TQM and CSR on Employees Job Satisfaction. *UKH Journal of Social Sciences*, 6(1), 1-9.
42. Foster, R.D. (2010). Resistance, justice, and commitment to change. *Human Resource Development Quarterly*, 21(1), 3-39.
43. Fragkos, K.C., Makrykosta, P., Frangos, C.C. (2020). Structural empowerment is a strong predictor of organizational commitment in nurses: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 76(4), 939-962.
44. Gambarotto, F., Cammozzo, A. (2010). Dreams of silence: employee voice and innovation in a public sector community of practice. *Innovation: Management, Policy & Practice*, 12(2), 166-179.
45. Godfrey, G., Dale, B., Marchington, M., Wilkinson, A. (1997). Control: a contested concept in TQM research. *International Journal of Operations & Production Management*, 17(6), 558-573. doi:10.1108/01443579710167258.
46. Goh, A.B. (2015). ROFO principle generates ownership, commitment and team learning – mindset change before implementing total quality management. *Total Quality Management & Business Excellence*, 26(7/8), 854-874. doi:10.1080/14783363.2014.90180
47. Golparvar, M., Oreizie, H. (2021). Direct and nondirect relationship between total quality management and perceived procedural justice with organizational commitment. *Management Research in Iran*, 13(2), 239-270.
48. Green, T.J. (2012). TQM and organisational culture: how do they link? *Total Quality Management & Business Excellence*, 23(2), 141-157.
49. Gul, A., Jafery, S.A.S., Rafiq, J.A.V.E.D., Naeem, H. (2012). Improving employees performance through total quality management. *International Journal of Economics and Management Sciences*, 1(8), 19-24.
50. Haffar, M., Al-Hyari, K., Djebarni, R., Alnsour, J.A., Oster, F., Al-Shamali, A., Alaya, A. (2023). The mediating effect of affective commitment to change in the readiness for change–TQM relationship. *Total Quality Management & Business Excellence*, 34(3-4), 326-344.
51. Hashim, K.F., Tan, F.B. (2015). The mediating role of trust and commitment on members' continuous knowledge sharing intention: A commitment-trust theory perspective. *International Journal of Information Management*, 35(2), 145-151.



52. Heath, P.M. (1989). The path to quality achievement through teamwork plus commitment. *International Journal of Quality & Reliability Management*, 6(2). doi:10.1108/EUM0000000001626
53. Hee, O.C., Yan, L.H., Rizal, A.M., Kowang, T.O., Fei, G.C. (2018). Factors influencing employee job satisfaction: A conceptual analysis. *International Journal of Academic Research in Business and Social Sciences*, 8(6), 331-340.
54. Hodson, R. (1997). Group relations at work: Solidarity, conflict, and relations with management. *Work and Occupations*, 24(4), 426-452.
55. Huy, Q.N. (2000): Do Humanistic Values Matter? *Academy of Management Proceedings*, 1, A1-A6.
56. Hwang, G.-H., Yoon, H.J., Choi, M. (2020). Soft TQM practices and employee outcomes: A mediational analysis. *Quality Management Journal*, 27(3), 147-158. doi:10.1080/10686967.2020.1767007
57. Inoue, A., Kawakami, N., Tsutsumi, A., Shimazu, A., Tsuchiya, M., Ishizaki, M., Tabata, M., Akiyama, M., Kitazume, A., Kuroda, M., Kivimäki, M. (2009). Reliability and validity of the Japanese version of the Organizational Justice Questionnaire. *Journal of Occupational Health*, 51(1), 74-83. doi: 10.1539/joh.18042.
58. Ismail, S.N. (2014). Total Quality Management (TQM) Practices and School Climate amongst High, Average and Low Performance Secondary Schools. *Malaysian Journal of Learning and Instruction*, 11, 41-58.
59. Jang, J., Lee, D.W., Kwon, G. (2021). An analysis of the influence of organizational justice on organizational commitment. *International Journal of Public Administration*, 44(2), 146-154.
60. Javaid, M., Kumari, K., Khan, S.N., Jaaron, A.A., Shaikh, Z. (2023). Leader green behavior as an outcome of followers' critical thinking and active engagement: the moderating role of pro-environmental behavior. *Leadership & Organization Development Journal*, 44(2), 218-239.
61. Kabak, K.E., Şen, A., Göçer, K., Küçüksöylemez, S., Tuncer, G. (2014). Strategies for employee job satisfaction: A case of service sector. *Procedia-Social and Behavioral Sciences*, 150, 1167-1176.
62. Kachwala, T., Panchal, D., Pai, P. (2021). The Critical Dimensions of TQM in Hospitality Services. *Journal of Hospitality Application & Research*, 16(2), 63-82.
63. Kanji, G.K., Asher, M. (1993). Gaining and sustaining commitment. *Total Quality Management*, 4(4), 35-41. doi:10.1080/09544129300000052.
64. Kanning, U.P., Hill, A. (2013). Validation of the Organizational Commitment Questionnaire (OCQ) in six languages. *Journal of Business and Media Psychology*, 4(2), 11-20.
65. Kassiech S.K., Yourstone S.A. (1998). Training, Performance Evaluation, Rewards, and TQM Implementation Success. *Journal of Quality Management*, 3(1), 25-38.

66. Kickul, J., Gundry, L.K., Posig, M. (2005). Does Trust Matter? The Relationship Between Equity Sensitivity and Perceived Organizational Justice. *Journal of Business Ethics*, 56, 205-218.
67. Kim, E.-J., Park, S., Kang, H.-S. (2020). Support, training readiness and learning motivation in determining intention to transfer. *European Journal of Training & Development*, 44(3/4), 306-321. doi: 10.1108/EJTD-08-2018-0075.
68. Kim, H.J., Min, J.Y., Min, K.B., Lee, T.J., Yoo, S. (2018). Relationship among family environment, self-control, friendship quality, and adolescents' smartphone addiction in South Korea: Findings from nationwide data. *PLoS ONE*, 13(2), e0190896.
69. Kirkland, J.C.R., Edwards, B.D., Flaherty, K.E. (2021). The effect of honest and humble leadership on salesperson customer orientation. *Journal of Business Research*, 130, 49-58.
70. Klotz, A.C., Bolino, M.C. (2013). Citizenship and Counterproductive Work Behavior: A Moral Licensing View. *Academy of Management Review*, 38(2), 292-306.
71. Krajcsák, Z. (2019). Leadership strategies for enhancing employee commitment in TQM. *Journal of Management Development*, 38(6), 455-463.
72. Krasachol, L., Tannock, J.D. (1999). A study of TQM implementation in Thailand. *International Journal of Quality & Reliability Management*, 16(5), 418-432.
73. Krzyżanowski, L. (1994). *Podstawy nauk o organizacji i zarządzaniu*. Warszawa: PWN.
74. Kubieniec, A. (2020). *Motywacja i zaangażowanie pracowników instytucji kultury. Etnografia biblioteki powiatowej*. Retrieved from: <https://ruj.uj.edu.pl/entities/publication/8a719bb5-6454-4c7f-b6fa-f99855a0d9ed>, 26.07.2024.
75. Kulenović, M., Folta, M., Veselinović, L. (2021). The analysis of total quality management critical success factors. *Quality Innovation Prosperity*, 25(1), 88-102.
76. Kumar, K., Bakhshi, A., Rani, E. (2009). Organizational Justice Perceptions as Predictor of Job Satisfaction and Organizational Commitment. *IUP Journal of Management Research*, 8(10), 24-37.
77. Kurdi, B., Alshurideh, M., Alnaser, A. (2020). The impact of employee satisfaction on customer satisfaction: Theoretical and empirical underpinning. *Management Science Letters*, 10(15), 3561-3570.
78. Lam, M., O'Donnell, M., Robertson, D. (2015). Achieving employee commitment for continuous improvement initiatives. *International Journal of Operations & Production Management*, 35(2), 201-215.
79. Lavy, N. (1994). Integrated Manufacturing Self-control. *The TQM Magazine*, 6(4), 18-21.
80. Liang, H.N., Saraf, Q.H., Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly*, 31(1), 59-87.
81. Liu, W. (2021). The Influence of Employee Involvement in Total Quality Management on Employee Performance. *International Journal of Business and Economic Affairs*, 6(2), 89-96.

82. Luo, J., Qiao, Z. (2020). Individual Commitment and Team Performance: Evidence from Mutual Fund Managers. *Journal of Financial & Quantitative Analysis*, 55(6), 2073-2098. doi: 10.1017/S0022109019000346.
83. Malik, M., Nawab, S., Naeem, B., Danish, R. (2010). Job Satisfaction and Organizational Commitment of University Teachers in Public Sector of Pakistan. *International Journal of Business and Management*, 5(6), 17-26.
84. Mayer, R.C., Schoorman, F.D. (1998). Differentiating Antecedents of Organizational Commitment: A Test of March and Simon's Model. *Journal of Organizational Behavior*, 19(1), 15-28.
85. Mendes, L., Carlos, V., Lourenço, L. (2014). The Influence of TQM on Organizational Commitment, Organizational Citizenship Behaviours, and Individual Performance. *Transylvanian Review of Administrative Sciences*, 111-130.
86. Meyer, J.P., Allen, N.J. (1991). A three-component conceptualization of organizational commitment. *Human Resource Management Review*, 1(1), 61-89.
87. Meyer, J.P., Parfyonova, N.M. (2010). Normative commitment in the workplace: A theoretical analysis and re-conceptualization. *Human Resource Management Review*, 20(4), 283-294.
88. Michaelis, B., Stegmaier, R., Sonntag, K. (2009). Affective commitment to change and innovation implementation behavior: The role of charismatic leadership and employees' trust in top management. *Journal of Change Management*, 9(4), 399-417.
89. Mo, Y., Borbon, N.M.D. (2022). Interrelationship of Total Quality Management (TQM), job satisfaction and organizational commitment among hotel employees in Zhejiang and Hainan provinces in China towards a sustainable development framework. *International Journal of Research*, 10(3), 1-16.
90. Mobolade, G.O., Akinade, M.E. (2021). Team building and teamwork in organizations: Implications to managers and employees in work places. *International Journal of Management, Social Sciences, Peace and Conflict Studies*, 11(4), 261-274.
91. Moccia, S. (2016). The role of value and virtues in TQM: an overview of literature. *The TQM Journal*, 28(2), 216-234.
92. Morgan, G., Pulignano, V. (2020). Solidarity at work: Concepts, levels and challenges. *Work, Employment and Society*, 34(1), 18-34.
93. Mowday, R.T., Steers, R.M., Porter, L.W. (1979). The Measurement of Organizational Commitment. *Journal of Vocational Behavior*, 14, 224-247.
94. Myers, S.A., Johnson, A.D. (2004). Perceived solidarity, self-disclosure, and trust in organizational peer relationships. *Communication Research Reports*, 21(1), 75-83.
95. Oakland, J.S. (1995). *Total Quality Management. Text with Cases*. Oxford: Butterworth Heinmann.
96. Oruma, B.W., Mironga, J.M., Muma, B.O. (2014). Top management commitment towards implementation of Total Quality Management (TQM) in construction companies in Nakuru

- county-Kenya. *International Journal of Economics, Finance and Management Sciences*, 2(6), 332-338.
97. Osigweh, Yg., Chimezie, A.B., Hutchison, W.R. (1989). Positive Discipline. *Human Resource Management*, 28(3), 367-383.
98. Othman, R. (2008). Organisational Politics: The Role of Justice, Trust and Job Ambiguity. *Singapore Management Review*, 30(1), 43-53.
99. Pankaj, S., Naman, J., Kunal, P. (2013). TQM: implementation, scope and myths-a review. *Research Journal of Engineering Sciences*, 2(6), 40-44.
100. Peccei, R., Rosenthal, P. (1997). The antecedents of employee commitment to customer service: Evidence from a UK service context. *The International Journal of Human Resource Management*, 8(1), 66–86. doi: 10.1080/ 09585199700000041.
101. Petry, J. R. (1992). *Efficiency vs. Effectiveness: Can W. Edwards Deming's Principles of Quality Management Be Applied Successfully to American Education*. Retrieved from: <https://files.eric.ed.gov/fulltext/ED355641.pdf>, 27.07.2024.
102. Piest, S., Schreck, P. (2021). Contests and unethical behavior in organizations: a review and synthesis of the empirical literature. *Management Review Quarterly*, 71(4), 679-721, doi:10.1007/s11301-020-00197-3.
103. Pillai, R., Williams, E.S., Justin Tan, J. (2001). Are the scales tipped in favor of procedural and distributive justice? An investigation of the U.S., India, Germany, and Hong Kong (China). *International Journal of Conflict Management*, 12(4), 312-332. doi:10.1108/eb022861.
104. Porter, L.W., Smith, F.J. (1970). *The etiology of organizational commitment*. Unpublished manuscript. University of California at Irvine.
105. Pradhan, S.K., Reosekar, R.S., Routroy, S. (2021). Enhancing supplier capability through Six Sigma enablers. *TQM Journal*, 33(8), 1683-1704. doi: 10.1108/TQM-06-2020-0141.
106. Rahman, A., Shahzad, N., Mustafa, K., Khan, M.F., Qurashi, F. (2016). Effects of organizational justice on organizational commitment. *International Journal of Economics and Financial Issues*, 6(3), 188-196.
107. Ray, D.W. (1994). The missing T in TQM... trust. *The Journal for Quality and Participation*, 17(3), 64.
108. Ribeiro, N., Duarte, P., Fidalgo, J. (2020). Authentic leadership's effect on customer orientation and turnover intention among Portuguese hospitality employees: the mediating role of affective commitment. *International Journal of Contemporary Hospitality Management*, 32(6), 2097-2116.
109. Richardson, C. (2008). Working Alone: The Erosion of Solidarity in Today's Workplace. *New Labor Forum*, 17(3), 69-78.
110. Rokeach, M. (1968). *Beliefs, Attitudes and Values. The theory of organizational change*. San Francisco: Jossey-Bass.

111. Schaufeli, W.B., Martínez, I.M., Pinto, A.M., Salanova, M., Bakker, A.B. (2002). Burnout and engagement in university students: A cross-national study. *Journal of Cross-Cultural Psychology*, 33(5), 464-481. doi:10.1177/0022022102033005003.
112. Sheng, C.W., Tian, Y.F., Chen, M.C. (2010). Relationships among teamwork behavior, trust, perceived team support, and team commitment. *Social Behavior and Personality: An International Journal*, 38(10), 1297-1305.
113. Sila, I., Ebrahimpour, M. (2003). Examination and comparison of the critical factors of total quality management (TQM) across countries. *International Journal of Production Research*, 41(2), 235-268. doi: 10.1080/0020754021000022212.
114. Snape, E., Wilkinson, A., Marchington, M., Redman, T. (1995). Managing human resources for TQM: possibilities and pitfalls. *Employee Relations*, 17(3), 42-51.
115. Snyder, N. (2010). *Vision, values, and courage: Leadership for quality management*. New York: Free Press.
116. Soltani, E., Lai, P.C., Gharneh, N.S. (2005). Breaking through barriers to TQM effectiveness: Lack of commitment of upper-level management. *Total Quality Management and Business Excellence*, 16(8-9), 1009-1021.
117. Spik, A., Klincewicz, K. (2008). Nowe kierunki w zarządzaniu ludźmi. Zaangażowanie organizacyjne. In: M. Kostera (ed.), Nowe kierunki w zarządzaniu (pp. 471-497). Warszawa: Wydawnictwo Akademickie i Profesjonalne.
118. Stinglhamber, F., Cremer, D.D., Mercken, L. (2006). Perceived Support as a Mediator of the Relationship Between Justice and Trust: A Multiple Foci Approach. *Group & Organization Management*, 31(4), 442-468. doi:10.1177/1059601106286782.
119. Suleman, Q., Gul, R. (2015). Challenges to Successful Total Quality Management Implementation in Public Secondary Schools: A Case Study of Kohat District, Pakistan. *Journal of Education and Practice*, 6(15), 123-134.
120. Tan, H.H., Lim, A.K.H. (2009). Trust in coworkers and trust in organizations. *The Journal of Psychology: Interdisciplinary and Applied*, 143(1), 45-66. doi:10.3200/JRLP.143.1.45-66.
121. Thompson, J.A., Bunderson, J.S. (2003). Violations of principle? Ideological currency in the psychological contract. *Academy of Management Proceedings & Membership Directory*, 28(4), 571-586.
122. Tingo, J., Mseti, S. (2022). Effect of employee independence on employee performance. *International Journal of Engineering, Business and Management*, 6(2), 1-11.
123. Tonjang, S., Thawesaengskulthai, N. (2020). *A systematic literature review of TQM and innovation in healthcare*. ISPIM Conference Proceedings. The International Society for Professional Innovation Management (ISPIM), pp. 1-17.
124. Varma, C. (2017). Importance of employee motivation & job satisfaction for organizational performance. *International Journal of Social Science & Interdisciplinary Research*, 6(2), 10-20.

125. Venkatakrishnan, J., Alagiriswamy, R., Parayitam, S. (2023). Web design and trust as moderators in the relationship between e-service quality, customer satisfaction and customer loyalty. *The TQM Journal*, 35(8), 2455-2484. doi:10.1108/TQM-10-2022-0298.
126. Walton, J.R., Salazar, R.J., Jifu, W. (2008). The Effects Of Adaptation, Commitment And Trust In Cross-Cultural Marketing Relationships. *Journal of Applied Business Research*, 24(3), 29-38.
127. Wang, L., Murnighan, J.K. (2011). On Greed. *Academy of Management Annals*, 5(1), 279-316.
128. Wei, F., Si, S. (2013). Tit for tat? Abusive supervision and counterproductive work behaviors: The moderating effects of locus of control and perceived mobility. *Asia Pacific Journal of Management*, 30(1), 281-296. doi:10.1007/s10490-011-9251-y.
129. Werdiningsih, R., Pudjiarti, E.S. (2001). Social interaction and total quality management as antecedents of knowledge sharing and organizational performance. *Journal Of Humanities And Social Science*, 21(3), 122-131.
130. Witt, L.A., Kacmar, K.M., Andrews, M.C. (2001). The Interactive Effects of Procedural Justice and Exchange Ideology on Superior-rated Commitment. *Journal of Organizational Behavior*, 22(5), 505-516.
131. Yahaya, R., Ebrahim, F. (2016). Leadership styles and organizational commitment: literature review. *Journal of Management Development*, 35(2), 190-216.
132. Zang, D., Liu, C., Jiao, Y. (2021). Abusive supervision, affective commitment, customer orientation, and proactive customer service performance: Evidence from hotel employees in China. *Frontiers in Psychology*, 12, 648090. doi:10.3389/fpsyg.2021.648090.
133. Zhang, C., Moreira, M.R., Sousa, P.S. (2021). A bibliometric view on the use of total quality management in services. *Total Quality Management & Business Excellence*, 32(13-14), 1466-1493.

## USE OF BUSINESS INTELLIGENCE TOOLS MANAGEMENT IN THE EXAMPLE OF IN THE HEALTHCARE SECTOR

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**Purpose:** The aim of this article is a presentation of a case study describing the stages of Business Intelligence (BI) system implementation in healthcare organisations and the reasons for this implementation. The implementation practices used are described and the benefits of the project are demonstrated.

**Design/methodology/approach:** The article presents the process of designing a BI system, which took place in subsequent stages such as: defining business goals, identifying data sources and developing a data flow structure diagram, defining functional needs and the form of presentation of management data.

**Findings:** The implementation of the BI environment in a healthcare facility brings the following benefits: Support for decision-making processes in the hospital management area, ensuring monitoring and analysis of the use of hospital resources, identifying the causes affecting the service time, risk management and data management.

**Practical implications:** The paper presents the process of implementing a BI system in healthcare facilities, indicates the validation and testing process, and demonstrates numerous advantages of implementing a BI system.

**Originality/value:** The study is a valuable material that can be used by both theoreticians and practitioners. The presented procedures can be successfully used in other industries to build BI systems.

**Keywords:** Business Intelligence, BI, Decision Support Systems, Healthcare, Data Driven Management, Big Data, IT tools.

**Category of the paper:** research paper.

## 1. Introduction

Healthcare is currently one of the fastest growing sectors of the economy (Gupta et al., 2024). It integrates the results of scientific advances from many fields and combines them with the latest advances in technology and information technology. Healthcare leaders need tools and solutions to help them improve their business processes, especially in terms of decision-making in the administrative management of units, while optimising activities that improve patient care. Hence the trend for hospital executives to turn to Business Intelligence (BI) solutions (Basile et al., 2024) to extract information from data sets and deliver it to their audiences in a specific decision-making context. In today's fast-paced healthcare environment, healthcare executives must cope with the increasing demand for administrative and clinical data to achieve management goals in the shortest possible time. In many cases, the use of BI can provide a viable solution to this problem.

The principal objective of this article is to present the process of designing a business intelligence (BI) system, with the aim of facilitating effective decision-making in healthcare institutions. The primary research methods employed in the article include a literature analysis, expert interviews, and a case study. A review of the literature revealed a substantial corpus of publications on the functionality and implementation of systems across a range of industries. As evidenced by Polish literature, examples of BI implementation in medical care and managerial dashboards in e-patients are also worthy of mention. A notable research gap has been identified in the domain of business intelligence (BI) application examples in healthcare, which this publication seeks to address. Expert interviews are an invaluable tool in the design of business intelligence (BI) systems in healthcare. Firstly, experts provide specialist knowledge of clinical processes, which allows for a more tailored adaptation of the system to the actual needs of users. Secondly, interviews can identify key performance indicators that the BI system should monitor, which is crucial for improving the quality of care and optimising costs. Thirdly, interviews also help to understand legal and regulatory requirements, which is necessary to ensure compliance of the BI system with regulations. Finally, the last method was the case study presented, which demonstrated the implementation of BI in a healthcare organisation.

The article identifies a research gap in the lack of standardisation and integration of Health Information Systems (HIS) with Business Intelligence tools for effective reporting both at management level and in support of emergency response. In particular, the period of the SARS-CoV-2 pandemic is highlighted, which revealed numerous problems with the development and sharing of reports, both in terms of their accuracy and their correspondence to the actual situation at a given time. The research question was therefore posed: what are the key challenges and benefits of implementing integrated Business Intelligence (BI) systems in healthcare organisations, with a particular focus on reporting needs?



Thus, the primary objective of the article is to analyse the process of implementing a Business Intelligence system in healthcare entities, focusing on the stages of implementation, the practices used, the tools used and the benefits of implementing such solutions. The article shows how BI systems can support decision making, performance monitoring and resource management in healthcare organisations. It also describes the specific challenges encountered in implementing BI systems.

The article attempts to justify three implicit assumptions:

1. business intelligence (BI) systems can significantly improve decision making in healthcare organisations,
2. standardisation of reporting and integration of data from multiple sources are key to operational efficiency in hospitals,
3. the implementation of BI in healthcare will improve the quality of real-time reporting and help manage crisis events.

This article uses a case study approach to describe the process of implementing a Business Intelligence (BI) system in two healthcare organisations: Prof. L. Giec Upper Silesian Medical Centre in Katowice-Ochojec and Prof. K. Gibiński University Clinical Centre in Katowice-Ligota.

## **2. Literature review**

Business Intelligence (BI) solutions are an environment of interconnected digital components that include tools, technologies and processes that collect, process, analyse and present data to support an organisation's business decisions (Singu, 2021). BI solutions are an effective way of transforming raw data sets into valuable information that can then be used to improve an organisation's operational efficiency, identify new business opportunities or enhance its competitiveness. Business Intelligence (BI) is a key aspect of modern organisations, enabling them to make informed decisions by transforming raw data into meaningful and useful information. The model BI environment that operates within an organisation comprises a set of tools, technologies, processes and practices that are designed and interrelated to collect, integrate, analyse and present business data (Davenport, 2012, pp. 1-12). This environment is an integral part of the decision-making process and enhances the organisation's ability to operate efficiently and effectively in the environment. At the core of any business intelligence environment is data. Almost all organisations generate and interact with significant amounts of data, from customer transactions, supply chain logistics and process handling to employee performance and management reporting (Aws et al., 2021, pp. 155-170). The main objective of a BI environment is to use this data to provide access to the kind of information that leads to effective and timely business decisions. This is achieved through components such as data

sources, data warehouses and stores, data integrations, analytical tools and reporting mechanisms. Data sources can include internal systems such as enterprise resource planning (ERP), customer relationship management (CRM), industry systems such as a health information system (HIS), and external data sources such as market reports, social media channels, government databases and other public data. Data from these sources is often disparate and in different formats. The challenge for the BI environment is to effectively integrate these different types of data into a single format that can be analysed. These integration activities are managed by extract, transform and load (ETL) processes (Wendy et al., 2022, pp. 34-41). ETL is therefore a key component of the BI environment, responsible for taking data from different sources, transforming it into a standardised format and loading it into a central repository, often referred to as a data warehouse (Palpanas, 2000, pp. 88-100). The transformation phase ensures that the data is cleaned, validated and organised so that it is ready for further use in the analysis process. This activity can include data aggregation, deduplication, error correction and standards implementation. Effective ETL processes are essential to maintain the accuracy and reliability of the data needed to extract the desired information.

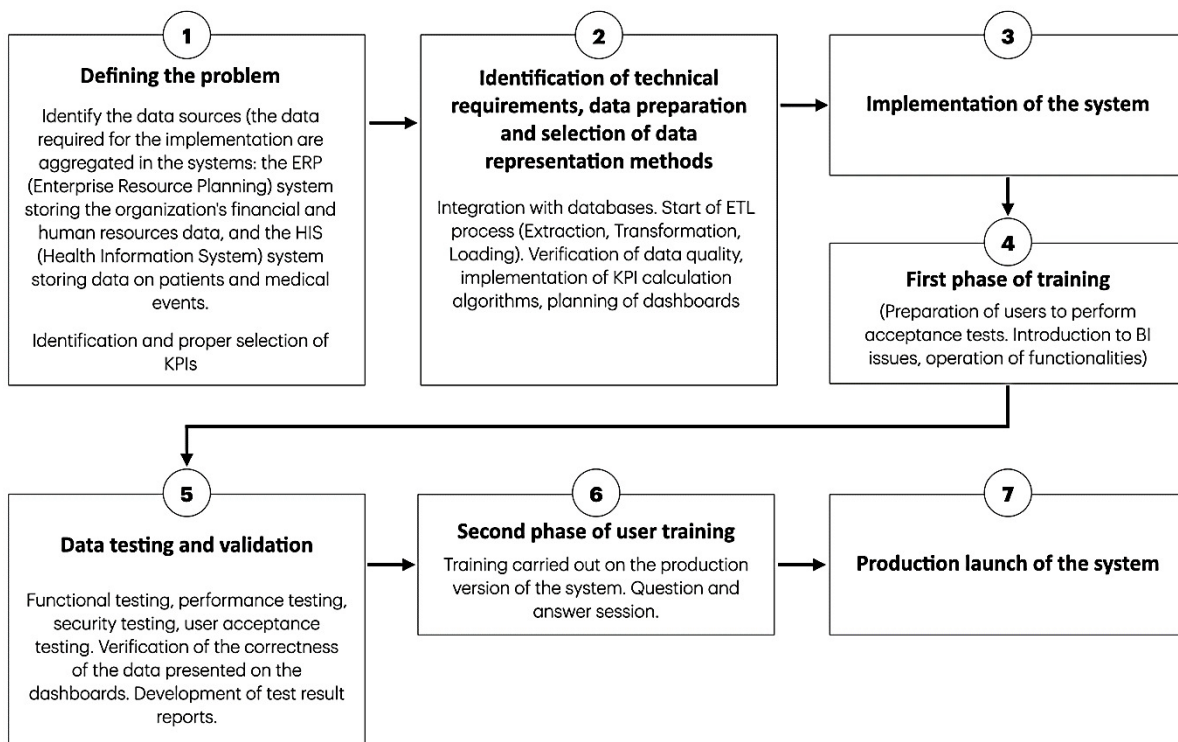
A concept closely related to business intelligence is the data warehouse, which acts as a central repository to store integrated data and whose architecture supports data analysis and reporting processes. Unlike operational databases, which are optimised for transaction processing, data warehouses have a structure that focuses on building complex queries and analyses. At the same time, data warehouses provide a stable environment in which to store historical data that can be used to identify trends, patterns and anomalies over time. In addition to data warehouses, modern BI environments also have data stores, which are storage repositories that can hold significant amounts of raw, unstructured or semi-structured data (Maaitah, 2023). These are designed to hold data in its native format until it is required for use in the analysis process. This flexibility allows organisations to store all of their data while ensuring that it can be processed on an ad hoc basis when required. The data collected in a BI environment also requires the use of analytical tools to extract knowledge and information. These tools allow users to explore data, run queries and perform any type of analysis required. Analytical tools can range from simple reporting tools to more advanced applications used in data mining or machine learning processes. They enable the creation of dashboards, advanced visualisations of data summaries and reports that summarise and support management decisions. Visualisations such as different types of charts, graphs and heat maps make it easier to interpret large data sets, identify trends and understand complex relationships in data. Business Intelligence environments typically have sophisticated reporting mechanisms that provide insight into various aspects of the business, such as financial performance, operational efficiency, customer satisfaction or organisational development trends. BI reports can be customised to meet the specific needs of the organisation's various stakeholders. The ability to share reports, publish them directly online using BI functionality, and their native

transformation to mobile devices makes them a highly effective tool with high dissemination efficiency within the organisation, which translates into both speed of decision making and a positive impact on wider communication. The role of BI in decision making cannot be overstated. By providing timely, accurate and relevant information, a BI environment enables decision-makers to make objective, data-driven decisions. This can lead to better strategic planning, optimised business processes and increased competitive advantage (Niu et al., 2021). Through BI analysis, it is possible to identify future opportunities and threats, better understand customer needs, streamline internal processes, optimise costs and a number of other beneficial aspects to support organisational growth planning. Although the concept of BI is not new, it is sometimes defined in different ways due to the complexity of the processes involved, as can be seen in the literature (Vugec et al., 2020). In the context of this study, BI is understood as a management tool that includes a set of applications, technical solutions and processes that are designed to monitor events and support management decisions. BI systems support the organisation at the decision-making level through the collection, analysis and reporting of internal and external data. The level of BI implementation in an organisation can be determined by considering its maturity and experience in extracting knowledge from data. Similarly, maturity represents 'the capabilities of an organisation with respect to a particular object class and application domain' (Röglinger, 2012, pp. 328-346). Depending on the source, 4-6 maturity levels are defined and the assessment includes some key dimensions (e.g. IT, data integration and information quality, quality of results). Maturity models are intended to help practitioners successfully implement BI initiatives in organisations and provide a benchmark for the organisation to aim for (Vugec et al., 2020). With regard to the logical use of so-called Big Data (large data sets), it is worth noting that in the case of traditional Business Intelligence solutions, data coming from different IT systems, such as the Enterprise Resource Planning (ERP) system, relationship management systems, supply chain management, etc., go through an ETL process (Extraction, Transformation, Load), are then transferred to the data warehouse and, in the final stage, various analyses are performed on them. An important element included in the Big Data architecture is the data processing cycle, which, according to K. Krishnan, "can be defined as the collection, processing and management of data resulting in the generation of information for end users" (Krishnan, 2013). The data collected as part of BI is structured and discrete in nature. BI-based activities also include the continuous improvement of the organisation's decision making. Therefore, BI environments and the processes that take place within them can be seen as adaptive activities - any inference made based on BI tools can and should be verified over time. Lessons learned from the analyses performed should be incorporated into the inference algorithms, which in turn will lead to their ever-increasing effectiveness. Therefore, when designing a BI environment in an organisation, an assessment should be made of the potential use of its components in the future or in a wider context. It is therefore important to ensure that they are both efficient for the present and scalable for future operations.

A review of the literature revealed a comprehensive database of publications on the functionality and implementation of systems across a range of industries. The Polish literature provides several examples of business intelligence (BI) implementation in medical care, including a case study of BI implementation in a medical care facility (Głód, 2014). Additionally, it presents examples of the use of managerial dashboards in the context of e-patients (Sołtysik-Piorunkiewicz, 2015). It has been demonstrated that there is a significant research gap in the area of examples of BI use in healthcare units, which this publication seeks to address.

### 3. Research methodology

The principal objective of this article is to present the process of designing a business intelligence (BI) system, with the aim of facilitating effective decision-making in healthcare institutions. The primary research methods employed in the article include a literature analysis, expert interviews, and a case study. The case study was conducted in accordance with the following stages, as illustrated in Figure 1 (Elbanna, 2006, pp. 1-20):



**Figure 1.** Case study stages.

Source: own study.

In following this process, it is important to ensure that a sufficient number of alternatives are considered, that the consequences of using these alternatives are reasonably foreseeable, and that comparisons are made correctly.

The aforementioned stages are inherently complex, particularly in the context of the contemporary business environment. A number of factors interact with multithreaded processes, making decision-making more challenging (Svenson, 1979, pp. 86-112), particularly in healthcare units. The principal challenges in this domain can be broadly categorised as follows:

1. *Many alternatives to choose from.* What appears to be a desirable state of affairs, and what information systems provide, is the large number of possible solutions to a given problem. Supported by artificial intelligence tools, predictive analytics tools can provide such a large pool of possible solutions that choosing the right one becomes extremely difficult. Since the rejected alternatives are a kind of proof of the possibility of following another path, the managerial decision becomes a burden for the person or persons who are obliged to identify only one. Although this is a purely psychological factor at the decision-making stage, it can have legal consequences in the longer term.
1. *Regulations.* The plethora of internal and external rules and regulations is not an ally when it comes to making decisions that must be made in full compliance with them. As a result, the decisions taken require a great deal of consultation, which is particularly difficult for managers when urgent action is required.
2. *Competition and changing public demands.* These factors are measurable and predictable in the short term, but at the same time highly sensitive to events of an unpredictable nature (political decisions, ideological influences, undesirable internal events affecting the image, etc.).
3. *The need to make decisions quickly and effectively.* Management effectiveness is defined in terms of both the accuracy of decisions and the time it takes to make them. It is difficult for an organisation to be effective in today's marketplace if it learns by trial and error, which used to be the norm.

The above factors mean that managers in particular in healthcare units need to be more sophisticated - they need to have access to new tools and techniques specific to their field. Evolving information systems have moved from traditional accounting into much more complex areas of management. Their potential is now being exploited from the design stages, through process monitoring, to the use of analytical methods to evaluate proposed predictive actions.

It can therefore be concluded that the development of information technology has clearly contributed to facilitating the development of decision support methods and analytics, and has also created a kind of ecosystem of interconnected components that can be broadly defined as Business Intelligence (BI) solutions. Logically, BI solutions consist of:

1. *Data*. In the context of BI, data is the raw form of as yet undefined information and is primarily transactional or operational records or stored values from which information and insights (new knowledge) can be extracted after processing (Morgan, 2006). Data used in BI environments can be a collection of numbers, text, images, audio, video, etc. Data can be stored in any form, size and location. Granular data is generated whenever an event or transaction occurs. The data used for analysis can be aggregated from a variety of sources, both the organisation's internal systems (ERP, HR, etc.) and external resources such as the Internet, technical devices, social media, etc. Put simply, anything that can be used to derive meaningful business intelligence can be included in the definition of data, regardless of where and how it is generated, whether it is structured or unstructured - it can always be an input to the BI process.
2. *Processes*. This term should be understood very broadly, often as a collection of many sub-processes, and therefore summarised as all the techniques, business strategies, tools, methodologies and activities of an organisation's personnel aimed at achieving a specific goal.
3. *Information*. Data, which is the base layer, becomes information when it is structured and given context and meaning. This meaning-making is done through metadata, which is an explanation and description of how the data should be used and what it should be used for.
4. *Knowledge*. In this case, it is defined as the logical outcome of data mining and analysis to enable decision making. By analysing a particular set of data, it is possible to identify specific trends or patterns, look for correlations and gain an understanding of the bigger picture, which in turn is translated into conclusions and decisions.
5. *Business*. This term in the definition of BI is not limited to commercial enterprises. It is used in a general sense to refer to any organisation that uses BI to improve its operations.
6. *Intelligence*. In the context of BI, this is knowledge about an object or situation. The PWN dictionary defines intelligence as 'the ability to understand, learn and apply one's knowledge and skills to new situations' (<https://sjp.pwn.pl/sjp/inteligencja>). Therefore, based on the above, it can be concluded that BI provides the ability to understand events based on the data collected in the organisation and to use the knowledge gained to make decisions.

From the above it can be concluded that BI is a concept that does not impose specific technologies, tools, methodologies or management techniques on an organisation. In most cases, BI is also not an off-the-shelf software or tool that can simply be bought, implemented and expected to work automatically. In essence, BI is a philosophy of how to approach data, conclusions and decisions. While BI does not by itself solve an organisation's problems, it certainly helps to identify them by presenting trends, patterns and correlations, by searching for and identifying anomalies and outliers, and by making it easier for the user

(most often the board) to identify problem areas that need attention early on. The fact is, however, that current AI solutions significantly enhance the potential of BI tools by augmenting them with natural language inference, making them far more automated (Eboigbe, et al., 2023, pp. 285-307). However, it is important to emphasise that only a thorough understanding of the issues and expected goals on the part of managers can make BI a tool that effectively improves the efficiency of an organisation's management activities. An inherent element of BI systems is data visualization, which is implemented using dashboards. Dashboards are visually the most recognisable element of Business Intelligence environments. Using a more specific definition of dashboards, we can say that they are dashboards of performance indicators that allow the visualisation of data, phenomena and information using all the visualisation methods and techniques described earlier in this paper (Zheng, 2017, pp. 67-81). Dashboards provide a visual representation of important information, consolidated and arranged on a single screen so that information can be covered at a glance, easily drilled down and explored. A typical dashboard in a hospital BI system contains numerous hospital-specific KPIs (Negash, 2008, pp. 175-193) and events occurring in the HIS (Health Information System) (Abouzahr et al., 2005, pp. 578-583). The information it displays is intended to provide the unit's management with quick access to an accurate set of information about the functioning of the healthcare unit. The dashboard is characterised by three levels of information:

1. Monitoring, i.e. graphical, abstracted data to monitor key performance indicators.
2. Analysis, which is a summary of dimensional data to analyse the root cause of problems.
3. Management, which focuses on detailed operational data that determines what actions need to be taken to address a specific problem.

By using layers, dashboards can contain multiple pieces of information on a single screen. The main challenge in designing a dashboard is to present all the necessary information on one screen, clearly and without distraction, in a way that can be assimilated quickly. To improve the assimilation of information, it is important to place it in context. This can be done by comparing the numbers of interest to other baseline or target values, indicating whether the numbers are good or bad, determining whether the trend is better or worse, and using display components to establish a comparative and evaluative context. Some of the typical comparisons that are made in Business Intelligence systems include comparisons with past values, forecast values, target values, baseline or average values and values of other metrics. Even with comparative measures, it is important to clearly indicate whether a number is good or bad and whether it is trending in the right direction. Typically, bespoke visual objects (e.g. traffic lights) or visual attributes (e.g. colour coding) are used to set the context of the assessment. Colour coding is most often used in conjunction with metrics to determine whether a KPI has exceeded/achieved a certain value. Although performance dashboards and information visualisation dashboards are used differently in different organisations, they all share certain design characteristics. First and foremost, they all fit into larger business analysis and/or performance measurement systems. This means that their underlying architecture is that of

a BI environment or the performance management architecture of a larger system. Secondly, all well-designed dashboards and other information visualisations share the following characteristics:

1. Use visual elements (e.g. charts, performance bars, indicators, gauges, graphical markers, alerts) to highlight at a glance the data and exceptions that require action.
2. Are transparent and legible to the user, requiring minimal training and therefore easy to use.
3. Combine data from different systems into a single, aggregated, unified picture that represents the specific state of an organisation or part of its operations.
4. Allow drill-down to primary data sources or reports, providing more detail for comparative and evaluative context.
5. Present a dynamic view with timely or real-time refreshes of data, enabling the end user to keep abreast of changes in the organisation.

## 4. Results

The research results were implemented in accordance with four principal stages. The initial stage of the research project was to define the primary issue concerning the reporting of the effects of the activities of the healthcare unit under study.

### STAGE 1 – Defining a problem

The design and implementation of a business intelligence (BI) system was conducted in the following healthcare unit. The Medical University of Silesia in Katowice, which is the founding body of the teaching hospitals in the Silesian Voivodeship, has identified two multi-specialty medical units, i.e. the Upper Silesian Medical Centre named after Prof. L. Giec in Katowice-Ochojec and the Prof. K. Gibiński University Clinical Centre in Katowice-Ligota, as hospitals in which Business Intelligence solutions should be implemented, as part of the "eCareMed" project (<https://app.ecaremed.pl/>) for the centralisation of medical services. Prof. L. Giec in Katowice-Ochojec and Prof. K. Gibiński University Clinical Centre in Katowice-Ligota, as hospitals in which business intelligence solutions will be implemented, aimed at multi-thematic reporting on patient care and financial status. The project will be implemented in the period from 01.01.2022 to 30.06.2023.

The period of the SARS-CoV-2 pandemic became a particular management challenge for many organisations, and particularly for healthcare institutions. Hospitals were those institutions that had to work harder than usual because of the special conditions in which they had to operate and the need to provide medical care to a larger number of patients than usual, while at the same time facing a high risk of losing staff due to sickness absence caused by



infection (Plagg et al., 2021, pp. 3987-3992). In addition to the medical measures taken, hospitals also faced many administrative challenges related to the rapid reconfiguration of wards to meet new needs, the effective management of space and bed availability, and the use of specialised medical equipment. Most importantly, these activities were accompanied by numerous reports to crisis management centres, government agencies or directly to the Ministry of Health. These reports were expected in the shortest possible time to show, for example, the actual status of bed availability, which was not a simple operation and, due to the delay in communication, did not translate into information that reflected the actual situation by the time the report was read. A hospital with a few free beds equipped with ventilators could become a shortage hospital within an hour. Once vaccination had begun, there was a further need to report on the number of people in the medical unit who had been vaccinated. Again, the time lag meant that it was impossible to keep the reports fully up to date. The activities of the hospital administrations, despite their reliance on reporting based on information systems, could not be effective for the following reasons, among others:

1. Lack of experience of administrative staff in creating non-standard reports not defined in the hospital information system
2. High complexity of producing reports for which the required data comes from more than one source
3. Lack of a defined reporting standard on the part of the requesting entity, or an imposed standard that is not implemented in the hospital's information system
4. Excessive complexity of communication (report approval processes, sending and receiving using different communication tools, need for certain people to be available in the communication chain)
5. The need for ad hoc reports when other staff tasks are required, often necessary for the continuity of the work of the healthcare entity.

The experience of the SARS-CoV-2 pandemic clearly demonstrates the need for mechanisms to compensate for the above-mentioned disadvantages, which could be achieved through the implementation of reporting tools that:

1. Allow the downloading of data from hospital systems in real time.
2. Provide a set of data based on a set of data collected in the system.
3. Come with ready-made sets of measures and indicators, the inclusion of which in the report does not require IT or statistical expertise on the part of the reporting staff.
4. Can be made available online as a cloud service.
5. Can be presented clearly on mobile devices.
6. Be able to be aggregated, i.e. provide the recipient with reporting totals from two or more reporting entities.
7. Provide dynamic presentation of data, both retrospective and prospective.
8. Automate the search for deviations or the achievement of pre-defined thresholds.

Management, especially crisis management, requires reliable information to be available as quickly as possible in order to make effective decisions. It is also important to provide different information or a different form of visualisation for specific individuals or organisational units. Similarly, it is important to enable authorised personnel to drill down into the data, i.e. to move dynamically from general information, such as the number of beds available in the hospital, to information on which wards these beds are located and how many patients are currently hospitalised per doctor on the ward. Only with this information can a rational, data-driven decision be made about transferring patients from other hospitals or recruiting additional staff. In this respect, business intelligence solutions are the solution that can meet the expectations for effective reporting. Healthcare organisations are recognising the need for IT solutions that, in addition to collecting medical and administrative data, will become a source of new knowledge to support hospital management processes based on the processing of large amounts of data (Batko et al., 2022). In recent years, healthcare systems have been severely disrupted by excessive and uneven demand for medical services. The SARS-CoV-2 pandemic has caused a number of difficulties that have significantly disrupted healthcare systems in many countries around the world. As a result, the adoption of technology-based solutions to streamline and optimise the operations of healthcare providers has become critical to the healthcare industry as a whole. This has led to increased demand for BI solutions. As a result of the SARS-CoV-2 pandemic, the global healthcare BI market is predicted to reach \$8.37 billion by 2028 (Rehman, et al., 2022, pp. 26-35).

The first stage of the research led to the result such as:

- Identification of the following KPI indicators.
- Identification of data sources and development of a data flow diagram,

Business objectives, as defined, are clearly defined, measurable results that an organisation wants to achieve within a given period of time (Fischer et al., 2020). Before defining them, it was assumed that each objective should be SMART, i.e. specific, measurable, achievable, relevant and time-bound (Latham, 2020, pp. 10-20).

1. To reduce by 50% within one year the time taken to obtain reporting information relevant to the organisation through the implementation of KPIs related to financial management and the efficiency of the use of hospital resources in relation to patient care.
2. Provide at least two pre-defined management dashboards within one year for each of the groups entitled to receive reports, enabling real-time monitoring of KPIs.
3. To standardise, within one year, the scope and presentation of the reports from both healthcare entities by the University.
4. Ensure, within one year, the availability of the ability to make reports available online to external entities (such as crisis management centres, ministries, etc.) in case of need.

Step I also included the identification of key KPIs, their critical thresholds and the assignment of rights to user roles, which were also defined as part of this phase. In total, more than 30 such indicators were identified in the process of developing the BI system implementation documentation, including:

1. *Profitability, liquidity, efficiency and debt ratios* at a given point in time and changes in the ratios over time. Indicator determined on the basis of the Regulation of the Ministry of Health of 12 April 2017 on economic and financial indicators necessary for the preparation of the analysis and forecast of the economic and financial situation of independent public health care institutions.
2. *The liabilities* due on a given date and the change of the indicator over time.
3. *Performance* of the contract with the National Health Fund (NFZ) by each contracted product, taking into account the number of services at a given point in time and the change in the indicator over time. Employment in specific groups of health care institutions.
4. *Employment* in each professional group, broken down into persons (numbers only) and full-time equivalents at a given point in time, and their change over time.
5. *The number of in-patients* at a given point in time and the change in this indicator over time.
6. *The number of inpatient beds*, broken down into free and occupied beds, per point in time and the change in the rate over time.
7. *The bed throughput rate* per point in time and the change in the rate over time.
8. *The average length of stay* per patient per target date and the change in the indicator over time.
9. *Number of people waiting for admission* to hospital/outpatient/hospice - by urgent and stable cases per target in time and change in the indicator over time.
10. *Waiting times for inpatient/outpatient/outpatient services* - by urgent and stable case per point in time and change of indicator over time.

The stage of defining business objectives and performance indicators was also required:

1. Appropriate prioritisation of objectives and needs. This was done using the MoSCOW method (Kravchenko et al., 2022, pp. 188-199), which categorises all pre-identified needs into those that are:
  - a. *Must be realised*, i.e. understood as necessary for the organisation when implementing a BI solution to support business decisions.
  - b. *Should be implemented*, i.e. not critical needs, but their implementation will significantly increase the effectiveness and usefulness of the use of BI tools.
  - c. *They could be implemented* as long as their implementation does not become technically and organisationally complex, leading to increased implementation costs and a significant extension of the implementation period.

- d. *They will not be realised now*, but technical and functional solutions should be considered during the implementation phase to enable such needs to be met in the future.
2. Adequate involvement of stakeholders from the entities affected by the BI system implementation. The first step was to identify the stakeholders, both in the management group of the entities and in the groups of future users and IT staff working with the contractor in the area of integration and configuration. The next step was to create a stakeholder matrix (Bahadorestani et al., 2020) and assign them to one of four groups:
    - a. Stakeholders with a strong influence on implementation and an interest in being kept informed of progress.
    - b. Stakeholders who have a high level of influence over implementation, but who have other responsibilities within the organisation, should only be informed of progress against key milestones.
    - c. Stakeholders who have little influence on the implementation, but who have a high interest in all its functionalities due to future exposure to the implementation product.
    - d. Stakeholders with little influence on implementation and who, due to their episodic involvement in the implementation process, do not require the full attention of the process.

In order to ensure effective communication with stakeholders, an online schedule of implementation meetings was set up, and their proceedings were recorded on video. This allowed stakeholder representatives who were unable to attend a particular implementation team meeting for objective reasons to view the material at a time convenient to them. In parallel, notes and memoranda of agreement were produced covering all relevant issues raised during the implementation phase.

### **Identification of data sources and development of a data flow diagram**

Identifying the organisation's data sources prior to implementing a business intelligence system is a key step in the process of creating a fit-for-purpose dataset and subsequent analysis. In both healthcare organisations, the data required to develop algorithms that calculate the values of KPIs according to the set objectives is stored in the databases of two systems: ERP (Enterprise Resource Planning), a system for managing the organisation's financial and human resources, and HIS (Health Information System), a system for recording medical events and patient services. In each of these units, the source data was stored in relational databases that allowed queries to be built using the SQL language. The comparison of objectives and data showed that there was no need to integrate with other data sources beyond ERP and HIS systems. However, it was also useful to analyse the transactional systems that operate alongside the ERP environment and entity-specific applications. The potential need to use external data sources was also examined. This approach is necessary to obtain a complete set of information

to identify current and future integration needs. The Phase I activities, using the MoSCOW analysis, identified both the requirements necessary to achieve the organisation's objectives and future needs. This in turn determines the need for a full inventory of internal and external resources, the type of databases, their granularity and data export capabilities. In addition to technical issues, it is not uncommon for the use of certain resources to require the involvement of source system vendors or updates to licensing policies. Therefore, the process of identifying data sources should be comprehensive and take into account potential non-technical barriers. The identification of data sources was carried out by checking the quality of the data, i.e. whether it is accurate, complete, up-to-date and consistent (Fan et al., 2022). The quality of the data used in a business intelligence environment depends on the following factors:

1. *The effectiveness of decisions based on data.* Poor data quality can lead to wrong decisions and conclusions, directly affecting the functioning of the organisation or the credibility of reports prepared for external institutions.
2. *User confidence in BI tools.* Any inaccurate information generated by the system negatively affects the perception of the functionality of the tools provided to the user. This not only leads to a reluctance to use certain solutions, but often becomes a factor that hinders the development of the BI environment in the organisation. The transformation towards a data-driven organisation (Hupperz et al., 2021), if it has such a strategic objective, is thus seriously jeopardised.
3. *Operational efficiency of the organisation.* While in a well-functioning BI environment the knowledge extracted from the data leads to the identification of constraints in the organisation's processes and can serve as a source of information on how to mitigate them, in the case of incorrectly generated outcome data, the effect can be quite the opposite and incorrect conclusions about processes can exacerbate organisational problems.
4. *Regulatory compliance.* In this case, inadequate quality of source data translated into reporting performed in the BI environment can place a legal burden on the organisation if the reporting is subject to financial, contractual or regulatory compliance, which is most often the case.

Based on the analyses performed, a data quality assessment report was produced. Its purpose was to identify and describe data quality issues, assess their impact on the organisation's business operations in the context of the planned BI system implementation, and propose corrective actions. The report described the scope of the source data assessment, the data quality assessment criteria used, and the methods and tools employed. Potential risks and threats associated with poor quality of specific data sets, such as the risk of wrong decisions, financial loss, compliance violations, are presented. For each risk, corrective actions (data cleansing, deduplication, error correction, etc.) and a suggestion for how data quality should be monitored to maintain high standards both after the corrective actions have been applied and in the future are provided. The criteria for assessing data quality were based on the

examination of data samples (McGilvray, 2021) (manual verification and through the use of validation scripts, depending on the technical possibilities and the survey under study) and were referred to:

1. *Accuracy*, i.e. checking how the data reflect reality. This activity refers to the comparison of data with reference data and focuses on finding incorrect numerical values, typing errors, data format errors or incorrect dates.
2. *Consistency*, i.e. checking the uniformity of data from different systems, databases or tables, achieved through cross-checks based on pivot tables and comparison reports.
3. *Completeness*, i.e. assessing whether all required data is available and complete. This activity focuses on identifying missing fields, incomplete records, omitted information extracted from external data sources.
4. *Timeliness*, i.e. verifying that the data in the system are current and reflect the current state of affairs, which is achieved by checking the frequency and extent of data updates and comparing them with the knowledge of those responsible for entering the data.
5. *Reliability*, i.e. verifying that all data comes from the correct data sources and that it has not been inadvertently modified by system operations. This is done by analysing the data collection flow and comparing the process path with the data management policy.
6. *Uniqueness*, i.e. checking that each record is unique and that there are no duplicates, i.e. duplication of data in the system. This involves checking the primary and foreign keys in the databases. The worst case scenario is the identification of duplicate data with different values as a result of different algorithms used to arrive at the final result.
7. *Integrity*, i.e. checking that the data remain consistent in terms of the relationships between them and that the relationships between them are logical.
8. *Accuracy*, i.e. the appropriate granularity of the data, which influences its usability in the generation of reports, where the final value or visualisation is the result of mathematical or statistical operations performed on the data.
9. *Accessibility*, i.e. the ability to obtain data from the source for further processing.
10. *Relevance*, i.e. an assessment of the importance and usefulness of the data in the context of the business objectives to be achieved. Barriers may include redundant information, unusable data formats, or units of measurement that need to be converted into the form expected by the report recipient.

As part of the data source availability analysis, the IT infrastructure requirements for co-location of BI tools were also reviewed and it was decided to allocate virtual space within existing resources for these requirements. On the basis of the analyses carried out, a description of the technical infrastructure was developed as part of the project documentation used as a follow-up to the open tender process for the supply and implementation of BI tools in the two hospitals. The following issues were also highlighted during this process:

1. The data presented on the dashboards must be automatically updated and downloadable at specified intervals (e.g. once a month, once a quarter, once a year).
2. The BI system must be scalable, i.e. it must be possible to use it for data sets other than those coming from the source systems of the healthcare entities (data formats: .xlsx, .json, .xml, .sql).
3. Developing calculation algorithms, i.e. ensuring that if a value is not explicitly stored in the source system, but needs to be calculated, the implemented BI mechanisms will calculate it.
4. Provide data fusion capabilities, which means connecting to at least two data sources, shaping the data as required, and then consolidating it into a single useful query.

The process of describing the data flow required the identification of entry, exit and processing points. This meant that the following were identified and described:

1. Where exactly will the data (records, tables, databases) be retrieved from?
2. Where and in what format will the data be transferred and what technical solutions will be used?
3. How are the results expected by the user, i.e. what performance indicators and forms of visualisation will be used, which will determine the type of algorithms that will process the input data into the resulting form?

One of the online tools was used to map and produce the data flow:

1. *DataFlow Diagram (DFD)* (Li et al., 2009, pp. 85-97), which is a graphical representation of the flow of information in the organisation as expected in the BI system implementation process. For the purpose of this activity, the system boundaries were defined, key processes, data flow directions and dependencies between processes were identified, and data stores were indicated.
2. A *data architecture diagram* that provides a visualisation of how data is organised, stored and managed in a system, thereby facilitating an understanding of the relationships between the different components of the system. Its purpose is to show how data is collected, stored, processed, managed and exchanged within and between system components.
3. *Business Process Diagram (BPD)* (White et al., 2004), which is a representation of the sequence of activities that occur within a specific business process. This diagram illustrates how specific activities, tasks or operations are carried out and how the various components of the organisation (people, departments or systems) are involved in the process.

## **STAGE 2 Identification of a functional requirements and form of management data presentation**

The prior definition of data sources and their scope, together with the identification of KPIs and the prioritisation of objectives, enabled a functional requirements analysis to be carried out. This involved gathering the expectations of the future users of the system, which was done by assigning KPIs to specific user roles that would use them, and then mapping these needs to data sets. The set of requirements primarily defined the mapping of KPIs to specific dashboards, while preserving the need to modify the dashboards if necessary.

The second stage of the research led to the identification of the following requirements for the designed BI system in the healthcare unit under study:

1. Ensure that the data export interface is consistent for all generated reports and allows metadata to be attached to the report (type of report/data, date generated, person responsible) while providing a mechanism/window for reviewing the list of generated reports.
2. Ensure that the BI system allows data to be imported from multiple sources.
3. Ensure that datasets can be a combination of multiple sources that can be filtered and combined to provide new data collections.
4. Ensure that when creating a dashboard, tiles can be moved or rearranged in any way, with the ability to scale, move and hide them to ensure personalisation of dashboards by the system users.
5. Ensure the generation of QR codes to allow access to data.
6. Provide the ability to modify the presentation of data on dashboards using a set of predefined charts and visual forms (more than 20 visual presentation methods defined in total).
7. Providing access to the command language syntax, which is a collection of functions, operators and constants, ensuring the use of formulas or expressions to perform calculations and return results, bypassing the options available from the system menus.

This phase also focuses on issues such as:

1. The layout of the dashboard (dahsboard): the individual components of the dashboard were designed to be intuitive and easy to navigate, while at the same time being divided into thematic sections to present the organisation of information in a clear way. This was done using UX (user experience) design principles (Law et al., 2009, pp. 719-728), which aim to meet the following requirements”:
  - a. Focus on user needs.
  - b. Intuitiveness based on design patterns and standardised terminology and infographics.
  - c. Consistency of the interface in terms of navigation, style, colours, fonts, etc.
  - d. Simplicity aimed at reducing redundant elements.
  - e. Clear communication of key information.



- f. Optimisation for maximum usability.
  - g. Efficiency through the design of optimal information access paths.
  - h. Effective provision of feedback that is fully understood by the user.
  - i. Minimalism, which fulfils both an aesthetic function (also important in interface design) and introduces clarity and legibility to all information presented.
2. Choice of visualisation: Appropriate types of visualisation were chosen for the different types of data and KPIs used, including bar charts, line charts, pie charts, heat maps and tables. The choice of visualisation was determined by the type of data and the purpose of the presentation.
  3. Colour optimisation: to highlight key information and facilitate quick interpretation of the data, appropriate colours were chosen to indicate positive and negative results while avoiding the introduction of visual chaos.
  4. Interactivity and filtering: the dashboards were designed to ensure proper interaction with the user by introducing features such as drill-down (insight into details), drill-through (jump to related reports), hover (display additional information when hovering) and dynamic filtering.

In addition, as is standard for this type of IT solution, requirements for system security, data encryption, compliance with current legislation (RODO, WCAG, interoperability) and system backup were defined. Among other things, the need to ensure:

1. Confidentiality, i.e. protection against disclosure to an unauthorised recipient.
2. Integrity, i.e. protection against unauthorised modification or corruption of data.
3. Accessibility, i.e. the ability to use certain functions of the system on the basis of granted rights.
4. Accountability, i.e. the definition and verification of responsibility for operations performed in the system.
5. Authenticity, i.e. the verification of the identity of entities and the veracity of resources.
6. Reliability, i.e. guaranteeing the expected behaviour of the system and the results obtained through it.

This phase was completed with the production of a full technical specification, describing all the requirements for the system to be implemented.

### **STAGE 3 Implementing the system**

System implementation activities have largely focused on the extract, transform, load (ETL) process (Simitsis, 2003).

The outcome of the third stage of research was the implementation of the system, which made use of the ETL system as an integral component of the constructed data warehouse system and BI environments. The findings of the third stage of the research project can be summarised as follows:

1. *Data extraction*, i.e. the process of extracting data (both structured and unstructured) from different sources, developing technical methods for connecting to databases and the periodicity of data extraction (real-time or scheduled).
2. *Data transformation*, i.e. the transformation and cleaning of data so that it conforms to the formats and standards of the target system. This process includes data cleansing, data transformation, data merging, data enrichment and, in some cases, data anonymisation.
3. *Data loading*, i.e. storing the processed data in the target BI environment (e.g. in a dedicated data warehouse) for use in reporting and visualisation.

ETL tools also transport data between sources and targets, use metadata to document how data elements change during this transport, exchange metadata with other applications as required, and manage all processes and operations at run time (e.g. scheduling, error management, audit logs, statistics). The ultimate goal of the ETL process is to load the warehouse with integrated and cleansed data. As part of the ETL process, data standardisation and duplicate removal mechanisms were implemented, and in the case of data anomalies, such as incorrect values, incorrect use of units of measurement or complete absence of data, appropriate scripts informed the healthcare provider of the situation, complementing the data preparation process carried out in Stage II (identification of data sources and development of a data flow structure diagram). Changes to correct errors in the source data area were made on an ongoing basis, and corrective action was taken at an organisational level in the case of missing data. It should be noted that the user interfaces of the source systems had special functions that allowed the introduction of data that was not ultimately in the database, as there was no obligation to introduce them prior to the implementation of BI solutions. The next step was to create management dashboards based on the requirements from Stage III (defining the functional needs and the form of presentation of management data) and to successively link the results of the work done on the source data, i.e. KPIs, charts, visualisations of historical data and their comparisons with current states. This process was carried out in constant consultation with the end users of the system. Both the correctness of the functions and algorithms were verified, as well as the limits of data mining in the context of the user roles defined in the system. In order to ensure identical solutions for the visualisation of the resulting data, the entire implementation was carried out with the simultaneous participation of representatives of the university implementation team and the two healthcare institutions. This activity involved a constant exchange of concepts and ideas for solving specific problems, which ultimately resulted in high implementation efficiency.

## STAGE 4 Testing and Validation

System performance testing, in the context of Business Intelligence (BI) and information systems in general, is a key process for assessing how well a system performs under different workloads and conditions.

The following activities were carried out as part of the implementation of the fourth stage, test scenarios, test cases, test schedule, resources required for testing and the metrics that would be used to assess performance. This phase included:

1. *Functionality testing* - the BI system is equipped not only with dashboards presenting data with the possibility of drill-down, but also with numerous functions for exporting data, publishing reports, sharing reports, creating personalised dashboards, defining alerts, changing the form of data visualisation, filtering data, building custom queries to source databases, etc. The tests therefore focused on report generation, visualisation development, dashboard interactivity, data filtering and integration effectiveness. All these functions were checked for correct operation and adjustments were made where necessary.
2. *Data validation* - users and administrators of the source systems verified the subsequent data components of the dashboard. Both calculation algorithms and the consistency of the displayed data with the source data were checked to ensure that there were no errors in numerical values, dates or text data.
3. *System performance testing* - the process included checking the speed of database queries, the speed of report generation and the level of equipment utilisation, i.e. CPU load and RAM consumption.
4. *Security testing* - as the system was implemented using web technology, security testing was based on the OWASP (Open Web Application Security Project) standard (Bach-Nutman, 2020). They included verification of the system's resistance to the vulnerabilities of the main threats defined and updated by the OWASP organisation, including the system's resistance to SQL injection, man-in-the-middle attacks and DDoS attacks.
5. *Usability testing*, i.e. verifying that the delivered BI solutions are intuitive, easy to use and meet user expectations. These tests were carried out with the active involvement of users, while verifying the requirements written in the documentation.

The final product of Phase V was the production of a report containing the methods and results of the activities undertaken:

1. A list of problems found during testing, with a unique identifier, description and step-by-step instructions on where the error occurred and how it was caused.
2. A prioritisation of the problems, following the nomenclature used in the implementation documentation, which divides bugs into critical, medium and low categories.

3. Recommended corrective actions for each identified problem.
4. Documentation attachments, i.e. screenshots, system logs, performance reports and security test reports generated by automation tools.

The role of the report is not only to document the functional status of the BI system, but it is also an important tool for communicating with stakeholders about test results, system status, risks and remediation plans. It is also an important source of information in the organisation's quality management process, helping to build IT environments with long-term efficiency and reliability.

### **STAGE 5 Staff training and production implementation**

The stage 5 realisation entailed the training of personnel with designated rights within the system. This training encompassed the following:

1. *Introduction to BI issues* - this process is necessary to prepare staff who have not been directly involved in the implementation process, but who will be direct or indirect users of the system. Direct users interact with the system through the use of specific dashboards, while indirect users are primarily recipients of reports and analysis generated by BI. Introducing this latter group of users to the concept of BI systems will enable them to be aware of their reporting needs and expectations, and the potential of the BI environment in the context of business analysis.
2. *Demonstration of the functional capabilities of the BI system* - this process included a presentation of the most important and commonly used functionalities of the system and served as preparation for the next training activity, the practical exercises.
3. *Hands-on training* - was a key element of the training process. They were based on pre-agreed training scenarios and enabled users to exploit the full potential of the system under the control of a specialist trainer. The scenarios were designed to cover all the basic system requirements defined in the implementation documentation.
4. *Question and answer session* - the completed practical exercises, combined with the previous training activities, provided a basis for informed and non-trivial questions about the functionality of the system.

The result of the fifth stage of the research was also:

1. *Training materials* - these included paper documentation and access to web-based materials from within the system. In addition, training sessions held with users were recorded online and added to the training resources.
2. *User support from the contractor* - a contractually guaranteed helpdesk, particularly useful in the early stages of using the system.
3. *Supplementary training* - at the request of users, the possibility of supplementary training has been provided once they have gained knowledge and experience of the system. Supplementary training is an excellent way of supplementing knowledge in areas that require specific knowledge of the BI system.

The completion of the training process has enabled the system to go into production.

## 5. Discussion

The rapid increase in the use of technology in the business environment has generated huge amounts of digital data as a result of the volume of transactions. Technological advances have made the use of IT tools and techniques a necessity to improve the operational activities of many businesses. Every organisation strives to gain market advantage, and healthcare providers are no different. The healthcare sector encompasses a multitude of stakeholders, including doctors, medical staff, insurance companies, service providers, regulators and government authorities, healthcare providers and, of course, patients themselves, who have a direct interest in the quality and accessibility of the services provided. Maintaining and managing all these relationships between all these stakeholders is a very difficult task without the use of new technologies, and the fact that these relationships ultimately boil down to human health and life makes them even more sensitive to the solutions used. The healthcare sector collects and processes very large amounts of data, so the use of BI solutions in this sector can certainly influence the improvement of decision-making processes. In summary, the correct implementation of a BI environment in a healthcare organisation brings benefits in many areas. In the area of organisational management, these include: support hospital management decision making, provide monitoring and analysis of hospital resource utilisation by optimising bed occupancy, operating theatre occupancy, use of specialist equipment and staff occupancy, resulting in improved cost effectiveness, supporting the identification of causes affecting patient service or length of stay and automating the reporting of deviations and anomalies in process chains, and improve the financial management of the organisation by identifying sources of loss, profitability analysis, optimal contract planning based on data and predictive methods, etc., effective risk management based on appropriately selected indicators and defined thresholds for critical values reported by the BI system, by centralising data, standardising collaboration between the different departments and administrative units of the hospital, ensuring reliable information at the output. Management issues directly related to strategic and operational planning, financial analysis and human resource management, it is worth noting that BI solutions can directly support healthcare areas. For example, in solutions dedicated to supporting patient care processes, BI can be a helpful tool for analysing patient data in real time and supporting medical decisions related to issues such as:

1. *Patient segmentation.* Enables grouping of patients for enrolment in clinical trials, prioritisation of surgical procedures, creation of dynamic queues for transplantation based on decision variables.
2. *Health plan analysis.* It makes it possible to tailor health programmes to the right groups of recipients according to age, place of residence, environmental conditions, etc. It also makes it possible to monitor the performance indicators of such programmes over time and thus to assess their effectiveness over time.

3. *Multi-resource planning*. In this respect, BI supports the analysis of supply chain effectiveness, scheduling and the correct matching of treatment appointments to room occupancy and staff availability.
4. *Analysis of treatment outcomes*. This area includes analyses of the duration of specific therapies, hospital stays, the number and type of tests performed, and the cost intensity of each of these processes. The results of such analyses can be used as a basis for introducing corrective and optimising solutions aimed at guiding the patient through the treatment process, selecting the best solutions and reducing costs.
5. *Evidence-based medicine*. This is an area of medicine that focuses on applying the best available evidence, obtained through the scientific method, to clinical decision making. The use case is to suggest medical guidelines based on patients' previous treatments, which in turn are based on analyses supported by BI tools.
6. *Drug withdrawal*. This is arguably a specific and important use case for BI solutions, ensuring the implementation of fast and effective procedures for the withdrawal of a specific drug by quickly identifying all patients to whom it has been prescribed.

In order to make responsible decisions, it is important not only to have a good understanding of BI tools and to define data sources accurately, but also to define objectives correctly, not only at the level of the organisation, but also at the level of crisis action centres, marshal offices, medical universities and the Ministry of Health. Decision-makers at different levels of health management need real-time information to manage data well and extract information that can improve health services and reduce risks in crisis situations. Technically, in terms of the availability of infrastructure and tools, it is possible to implement centralised reporting and reasoning systems, and the provision of real-time data seems crucial for the efficient management of such an important area of social life. The safety and quality of health care services can be improved by measuring the effectiveness of the measures taken and, on the basis of the lessons learned, eliminating irregularities while striving for standardisation. This, in turn, should lead to the integration of activities within healthcare entities and the flow of information, while measuring KPIs in real time. For an organisation to build a BI environment that meets its needs, it should ensure that the following issues are properly and responsibly addressed:

1. Define clear, SMART business objectives and communicate them to all stakeholders, highlighting the tangible benefits to the organisation and its people that will result from the implementation. At this point, it is important to ensure that the implementation of BI solutions is in line with the organisation's strategy.
2. Conduct a detailed audit of the organisation's existing data sources, systems and interdependencies between processes and, based on this, develop the expected model of data flow into the warehouse or data warehouse.

3. Develop a matrix of roles and responsibilities associated with the implementation of BI solutions to ensure the required quality, security and compliance of the data captured for the final reports generated by the implemented tools.
4. Research and evaluate BI solutions available on the market based on the organisation's specific needs, budget, scalability and ease of use.
5. Develop a strategy for data extraction, transformation and loading (ETL) processes to ensure effective data integration.
6. Ensure proper data quality by implementing data cleansing and validation procedures and mechanisms to ensure that the data used in the BI system is accurate, complete and reliable.
7. Plan the implementation with scalability in mind to ensure that the BI environment can grow over time as the needs of the organisation increase.
8. Develop a data security plan, with particular emphasis on protecting sensitive data from unauthorised access and integrity breaches.
9. Develop an implementation roadmap with milestones and frequency and scope of progress reporting.
10. Ensure the ergonomics of the BI system by maintaining good UX design practices and understanding the needs of future users.
11. Develop a comprehensive training programme.
12. Provide user support services, including access to documentation, training materials and technical advice.
13. Establish maintenance processes for the BI system, including updates, patches, data quality checks and performance tuning.

It is very important to properly address the cultural change of the organisation related to the implementation of a BI system (Arefin et al., 2015, pp. 263-285). Indeed, this is a key step in the organisation's transformation to a data-driven organisation. It is therefore important to continuously communicate the benefits to staff, provide ongoing support to the teams involved in the implementation and involve other stakeholders to overcome resistance to change. During the transformation phase, it is good practice to regularly gather feedback from users, identify areas for improvement and implement updates and new features in the BI environment.

In the same way that BI dashboards use key performance indicators to inform users about the health of individual processes, an organisation's entire BI environment should be monitored to ensure the success of its implementation. It makes sense to regularly measure user satisfaction, analyse system performance and review its impact on the overall performance of the organisation in the areas to which BI is directly linked.

## 6. Conclusions

The principal conclusions of the case study, as set forth in the article, indicate the necessity for business intelligence (BI) solutions that facilitate real-time reporting and data analysis, which is pivotal to enhancing crisis management in terms of automation and immediate access to data. It is similarly important to guarantee the standardisation of healthcare reporting at the national or regional level, if not beyond. Business intelligence tools utilising consistent data sources can serve as a valuable repository for management and planning information. The implementation of BI also offers additional benefits, such as the ability to utilise predictive analytics or integrate with other systems that provide a more comprehensive range of information. These advantages contribute to the effectiveness of healthcare entities and their strategic role in managing crisis events.

This article presents the methodology employed in the design and implementation of a Business Intelligence class system for a healthcare entity. The epidemiological situation has created a necessity for the implementation of an effective reporting system within healthcare units, with the objective of facilitating decision-making at the national level in the context of crisis management. This paper presents a comprehensive description of the five-step process of designing and implementing a BI system. Given the complexity of the issue, the article identifies the most important aspects and notes that each stage of the activities carried out constitutes a separate area of analysis. The article is a valuable resource for both theoreticians and practitioners in the field of business analytics. The article offers new insights into the practical implementation of BI in healthcare, as evidenced by the literature review. As each BI system is tailored to the organisation, the identified steps of the designed system can be used as a model for other industries. However, examples of key indicators, specialised data sources or dashboards identified at each stage are unique to each industry. The topics and scope of future research in the area of BI development will be broad and focus on integration with modern technologies and artificial intelligence.

The article presents the process of designing and implementing a business intelligence system to meet the needs of a healthcare unit. The epidemiological situation has created a necessity for the effective reporting of the current situation in healthcare units for the purpose of decision-making at the national level in the field of crisis management. The article presents a comprehensive account of the five-stage process of designing and implementing a BI system. Given the complexity of the issue, the article indicates the most important aspects, but it should be noted that each of the stages of the activities carried out constitutes a separate area of analysis. The article provides a valuable resource for both theoretical and practical scholars in the field of business intelligence. The article contributes new insights into the practical implementation of BI in a healthcare setting, as evidenced by the literature review. As each BI system is bespoke to the organisation in question, the identified stages of the



designed system can be used as a model for other industries. However, the sample key indicators, specialist data sources or dashboards identified in the individual steps are unique to each industry. The topic and scope of future research in the field of BI development will be extensive and will primarily concern integration with modern technologies and artificial intelligence.

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## References

1. Abouzahr, C.B. (2005). Ties. Health information systems: the foundations of public health. *Bulletin of the World Health Organization*, 83, 578-583.
2. Arefin, M.S., Hoque, M.R., Bao, Y. (2015). The impact of business intelligence on organization's effectiveness: an empirical study. *Journal of Systems and Information Technology*, 17, 3, 263-285.
3. Aws, A.L., Ping, T.A., Al-Okaily, M. (2021). Towards business intelligence success measurement in an organization: a conceptual study. *Journal of System and Management Sciences*, 11, 2, 155-170.
4. Bach-Nutman, M. (2020). Understanding the top 10 owasp vulnerabilities. *Arxiv preprint arxiv:2012.09960*.
5. Bahadorestani, A., Naderpajouh, N., Sadiq, R. (2020). Planning for sustainable stakeholder engagement based on the assessment of conflicting interests in projects. *Journal of Cleaner Production*, 242, 118402.
6. Basile, L.J. et al. (2023). Business intelligence in the healthcare industry: The utilization of a data-driven approach to support clinical decision making. *Technovation*, 120, 102482.

7. Batko, K., Ślęzak, A. (2022). The use of Big Data Analytics in healthcare. *Journal of Big Data*, 9, 1, 3.
8. Davenport, T.H. (2012). Business intelligence and organizational decisions. In: *Organizational Applications of Business Intelligence Management: Emerging Trends*. IGI Global, pp. 1-12.
9. Eboigbe, E.O. et al. (2023). Business intelligence transformation through AI and data analytics. *Engineering Science & Technology Journal*, 4, 5, 285-307.
10. Ecaremed Śląska Platforma Pacjenta, <https://app.ecaremed.pl/>, 31.08.2024.
11. Elbanna, S. (2006). Strategic decision- making: Process perspectives. *International Journal of Management reviews*, 8, 1, 1-20.
12. Fan, W., Geerts, F. (2022). *Foundations of data quality management*. Springer Nature.
13. Fischer, M. et al. (2020). Strategy archetypes for digital transformation: Defining meta objectives using business process management. *Information & Management*, 57, 5, 103262.
14. Głód, G. (2014). Zastosowanie systemu klasy Business Intelligence w jednostce ratownictwa medycznego-studium przypadku. *Roczniki Kolegium Analiz Ekonomicznych/Szkoła Główna Handlowa*, 35, *Technologie informatyczne w służbie zdrowia*, 91-103.
15. Gupta, A., Singh, A. (2023). Healthcare 4.0: recent advancements and futuristic research directions. *Wireless Personal Communications*, 129, 2, 933-952.
16. Hupperz, M.J. et al. (2021). What is a data-driven organization? *AMCIS*.
17. Kravchenko, T., Bogdanova, T., Shevgunov, T. (2022). Ranking requirements using moscow methodology in practice. *Computer Science On-line Conference*. Cham: Springer International Publishing, pp. 188-199.
18. Krishnan, K. (2013). Data warehousing in the age of big data. *Newnes*.
19. Latham, G. (2020). Goal setting: A five-step approach to behavior change. In: *Organizational collaboration*. Routledge, pp. 10-20.
20. Law, E.L.-C. et al. (2009). *Understanding, scoping and defining user experience: a survey approach*. Proceedings of the SIGCHI conference on human factors in computing systems, pp. 719-728.
21. Li, Q., Chen, Y.-L. (2009). Data flow diagram. In: *Modeling and Analysis of Enterprise and Information Systems*. Berlin/Heidelberg: Springer, pp. 85-97.
22. Maaitah, T. (2023). The role of business intelligence tools in the decision making process and performance. *Journal of Intelligence Studies in Business*, 13, 1, 43-52.
23. McGilvray, D. (2021). *Executing data quality projects: Ten steps to quality data and trusted information (TM)*. Academic Press.
24. Morgan, K. (2006). *Mining, What Is Data*. *Data mining: Concepts and techniques*, 10.559-569, 4.
25. Negash, S., Gray, P. (2008). Business intelligence. *Handbook on decision support systems*, 2, 175-193.

26. Niu, Y. et al. (2021). Organizational business intelligence and decision making using big data analytics. *Information Processing & Management*, 58, 6, 102725.
27. Palpanas, T. (2000). Knowledge discovery in data warehouses. *ACM Sigmod Record*, 29, 3, 88-100.
28. Plagg, B. et al. (2021). Primary health care and hospital management during COVID-19: lessons from Lombardy. *Risk Management and Healthcare Policy*, 3987-3992.
29. Rehman, M.U. et al. (2022). Elaborating the Role of Business Intelligence (BI) in Healthcare Management. *Journal of Intelligence Studies in Business*, 12, 2, 26-35.
30. Röglinger, M., Pöppelbuß, J., Becker, J. (2012). Maturity models in business process management. *Business Process Management Journal*, 18, 2, 328-346.
31. Simitsis, A. (2003). Modeling and managing ETL processes. In: *VLDB phd Workshop*.
32. Singu, S. (2021). Business Intelligence on the Quality of Decision Making. *International Journal of Statistical Computation and Simulation*, 13, 1.
33. Słownik Języka Polskiego PWN, <https://sjp.pwn.pl/sjp/inteligencja;2561737.html>, 31.08.2024.
34. Sołtysik-Piorunkiewicz, A., Furmankiewicz, M., Ziuziański, P. (2015). Kokpit menedżerski jako narzędzie wspomaganie decyzji prosumenta w e-zdrowiu. *Prace Naukowe. Uniwersytet Ekonomiczny w Katowicach*, 188-212.
35. Svenson, O. (1979). Process descriptions of decision making. *Organizational behavior and human performance*, 23, 1, 86-112.
36. Tietze, W. et al. (2022). Teaching the ETL process. *Strategic Finance*, 104, 2, 34-41.
37. Vugec, D.S. et al. (2020). Business intelligence and organizational performance. *Business Process Management Journal*, 26, 6, 1709-1730.
38. White, S.A. et al. (2004). Process modeling notations and workflow patterns. *Workflow handbook*, 12, 265-294.
39. Zheng, J.G. (2017). Data visualization in business intelligence. In: *Global business intelligence*. Routledge, pp. 67-81.



## COLLABORATIVE CONSUMPTION AS AN ALTERNATIVE TREND IN CONSUMER BEHAVIORS ON THE EXAMPLE OF GENERATION Z

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**Purpose:** The theoretical aim of this paper is to characterize the concept of collaborative consumption as a trend alternative to market consumption based on product ownership. The practical goal, on the other hand, is to determine the degree of knowledge of collaborative consumption among representatives of Generation Z, to learn about the ways in which this particular generation participates in initiatives and activities within collaborative consumption, to learn about the assessment of the consumption various forms, as well as about the motives for engaging in them.

**Design/methodology/approach:** The theoretical part uses the method of critical analysis of the literature, while the empirical part contains the results of own research using an online survey conducted among representatives of Generation Z.

**Findings:** The research results reveal that, on the one hand, the representatives of Generation Z lack the knowledge of the concept of collaborative consumption or of the concepts related thereto, but on the other hand – that they actively participate in some forms of the consumption, which is connected with a varied assessment of individual forms of collaborative consumption. Among the motives of involvement in collaborative consumption, economic motives are definitely dominant, while ecological and social motives are of lesser importance.

**Research limitations/implications:** The results of the research provide a valuable source of information on the perception and participation of Generation Z in collaborative consumption and fill the gap in this area. The limitations of the study are due to the use of the online survey method. The aim of the acquired knowledge, both methodological and empirical, is to improve the methodology of nationwide representative surveys planned in the future.

**Practical implications:** The results of the research provide the knowledge being the basis for the creation and development of various forms of entrepreneurial activity and business models based on the concept of collaborative consumption.

**Social implications:** Collaborative consumption can be treated as an alternative way of satisfying consumers' needs in conditions of economic duress and deteriorating environmental conditions. At the same time, it contributes to building up social relationships.

**Originality/value:** The conducted research provides a new perspective on collaborative consumption in the context of a particular group of consumers on the market, i.e. representatives of Generation Z. The originality is related to the results of empirical research presenting collaborative consumption in the context of the behaviors of Generation Z.

**Keywords:** consumer, consumer behaviors, collaborative consumption, Generation Z.

**Category of the paper:** Research paper.

## 1. Introduction

The concept of consumption is very strongly rooted in the description of societies, and consumer behaviors are currently characterized by high variability and complexity, which means the occurrence of various consumption paradigms and consumption models (Bywalec, 2007, 2010; Zalega, 2012; Bylok, 2013; Mróz, 2013; Bywalec, 2017; Lipowski et al., 2020). One relatively new trend in consumer behaviors is collaborative consumption, also referred to as joint, access-based, shared, co-operative or co-consumption<sup>1</sup>. This phenomenon is also referred to as a trend alternative to the traditional understanding of market consumption based on buy-sell transactions, and at the same time it is in line with parallel trends in the development of consumption, including dematerialization, virtualization, servicalization or greening (Wardak, Zalega, 2013).

In the literature, collaborative consumption and the sharing of things related thereto are more popular among younger age groups, including the so-called Generation Z (people born after 1994), which results from the fact that they grew up in a specific economic, political, socio-cultural and technical-technological context (Zgiep, 2014; Garcia-Rodriguez et al., 2022).

The concept of collaborative consumption was first used by Felson and Spaeth (1978) in the late 1970s in the paper “Community Structure and Collaborative Consumption: A Routine Activity Approach”. The authors defined collaborative consumption as the process in which one or more people consume goods or services by engaging in joint activities with others, and they used travelling together with friends in their car (car-sharing/pooling) as an example. However, they did not realize at the time how dynamically this phenomenon would develop in the first and second decade of the 21st century. Much later, in 2007, the concept of collaborative consumption was used by Algar (2007), who published a paper entitled “Collaborative Consumption”, and Botsman and Rogers (2010) popularized the term in their monograph entitled “What’s Mine Is Yours: The Rise of Collaborative Consumption”, in which they conducted an in-depth analysis of collaborative consumption and attempted to confirm that it was not a short-term phenomenon, but a long-term change in consumer behaviors. They pointed to the need for changes in consumer behaviors that would help to maintain a better balance in the natural environment due to the rapidly consumed natural resources. The book publication coincided with the first TEDx conference in Sydney in 2010, during which Botsman presented a model of collaborative consumption supported by the results from many years of research, describing the phenomenon as “the new socio-economic ‘great idea’ signaling a revolution in

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<sup>1</sup> The adjective “collaborative” in the general sense can be understood as “co-operative”. However, in some Polish studies an opinion is expressed that the term *konsumpcja kolaboratywna* should not be used because the current dictionary of the Polish language does not include the adjective describing the noun. *Konsumpcja kolaboratywna* is therefore treated as a loan translation of the English term collaborative consumption. On the other hand, it is emphasized that in future the term *konsumpcja kolaboratywna* will become widely used in the Polish terminology, as was the case with many other terms borrowed from English (Burgiel, 2015a).

the way of consumption” (Stępnicka, Wiączek, 2018). In the same year, Gansky’s monograph “The Mesh: Why the Future Business Is Sharing” was published. It presents collaborative consumption as a rapidly changing phenomenon that shapes the face of consumption. The change in attitudes of some today’s consumers, consisting in the increase in the importance of collaborative consumption, was confirmed in subsequent years in publications by such authors as Bardhi and Eckhardt (2012), Bainbridge (2013), Lamberton (2016), Anwar (2023).

In the literature in Poland, the concept of collaborative consumption appeared in the second decade of the 21st century. In the context of consumer behaviors it was investigated by, among others, Mróz (2013), Wardak and Zalega (2013), Burgiel (2015a; 2015b), Małecka and Mitreęga (2015; 2017), Rudawska (2016), Kamińska (2017), Koźlak (2017), Szymańska (2017), Dąbrowska and M. Janoś-Kresło (2018), Włodarczyk (2018), Zalega (2020). An attempt to determine the impact of collaborative consumption on the economic development and the formation of new business models can be found in the works of Małecka (2016), Janczewski (2017), Mazurek-Łopacińska and Sobocińska (2018). It should be mentioned that few of the above works contain results of own empirical research of a primary nature. In this area, there is a huge research gap.

## **2. Collaborative consumption as a trend alternative to ownership-based consumption**

Collaborative consumption refers to a model of consumption that involves sharing, exchanging, lending and reselling goods and services between consumers, as well as sharing goods and services, and more broadly speaking – resources. While in the case of traditional (market) consumption we have to do with the transfer of ownership of the acquired good, i.e. an acquisition of goods into ownership, in the case of collaborative consumption there is no ownership transfer. The focus on the function of the product (so-called product service approach) and the access to and the ability to actually use it (so-called pay-per-use), are perceived as more important than owning the product (cf. Table 1) (Wardak, Zalega, 2013; Burgiel, 2015a; Rudawska, 2016; Mazurek-Łopacińska, Sobocińska, 2018). What is particularly important, an entity participating in the collaborative consumption process can remain only on the demand side, but it can also easily become an active participant in the market supply side, offering its resources to others interested in using them, while the offer can be both free of charge and paid (Mróz, 2013; Kamińska, 2017).

**Table 1.***Collaborative consumption and ownership-based consumption models*

| <b>Differentiating criteria</b>  | <b>Shared consumption</b>   | <b>Ownership-based consumption</b>   |
|--|---|--|
| <b>Main behaviors shaping the consumption model and lifestyle</b>            | borrowing, renting, sharing, exchanging goods, joint use  | buying, possessing, using (including exclusive use), disposing, selling, expressing oneself through held products  |
| <b>Ownership rights</b>  | paid or free use of goods not always related to the transfer of ownership (use of goods without the ownership title or transfer of ownership rights through exchange or donation)                             | access to goods by acquiring ownership rights  |
| <b>Needs, motivations and values associated with the type of consumption</b> | need of social contacts, sense of community, group membership, trust, sustainable development, environmental concerns, freedom, need to oppose excessive consumption, rationalization, deconsumption, economy | acquisition, collection, accumulation of goods, consumption, material status, individual, individualism, hedonism, prestige resulting from possession, self-expression through the brand of products |
| <b>Dominant type of relationship and network</b>                             | consumer-to-consumer; decentralized networks  | consumer-product; centralized networks   |
| <b>Length of time the product remains in use</b>                             | relatively long; extending the time of the use of products by consumers   | relatively short; tendency to replace products with newer ones   |
| <b>Type of innovation</b>  | social innovation, breakthrough innovation  | different types of innovation  |

Source: Mazurek-Łopacińska, Sobocińska, 2018.

Although the phenomenon of collaborative consumption in the sense of co-operation has been characteristic of human behavior practically since the dawn of time, the term itself appeared relatively recently, and its understanding has significantly evolved and changed in recent years. The idea of collaborative consumption dates back to the time when people started to co-operate and provide services to each other if a need for that arose. One example is neighborhood aid, which manifests itself in lending/borrowing necessary items, resulting from the rarity of their occurrence, the impossibility of purchase or the need to economize (Burgiel, 2015b; Janczewski, 2017; Mazurek-Łopacińska, Sobocińska, 2018).

The concept of collaborative consumption is relatively new and complex at the same time, and for this reason the number of publications, especially those containing results of empirical research in this area, is limited. There is no single empirically confirmed theory that describes and explains the phenomenon. Empirically, this is an emerging area. Undoubtedly, any research in this field will enable a better understanding of the essence of collaborative consumption, the prospects of its development and its impact on the shape of present and future social and economic life.

The issues of collaborative consumption, as well as the concept itself, are, contrary to how they seem, difficult to define unambiguously, because new forms of consumption are constantly arising. There are opinions that manifestations of collaborative consumption are observed in many areas of life and escape standard divisions (Mazurek-Łopacińska, Sobocińska, 2018). In addition, the descriptions and definitions of the phenomenon found in socio-economic theory and practice are often presented and interpreted for the specific use of the interested parties,



including business entities, and they depend on the actual need. An additional problem in Polish conditions are the many terms used with reference to the forms of collaborative consumption taken from the English language, which are difficult to translate and convey their essence, and which are thus incomprehensible (Janczewski, 2017).

### **3. Origin, dimensions and forms of collaborative consumption**

Many authors emphasize that the pillar of collaborative consumption is the idea of sustainable development, treated as a counterbalance to the generally negatively perceived phenomenon of consumerism. The economic development to date has been mainly related to the production and consumption of more and more goods and services. A consumer with a growing purchasing fund has been interested in buying an increasing amount of goods and services, which has led to overconsumption and hyperconsumption. These phenomena are still observed in many markets, mainly in developed countries. An alternative to this mainstream will be actions related to a reduction in excessive consumption, and conscious and voluntary simplification of lifestyle, i.e. the so-called anti-consumption. It should be emphasized that “this activity and attitude do not have to be related to only limiting consumption as such. They can also mean opposing excessive consumption and acquiring harmful goods in excess” (Rudawska, 2016, p. 182). In this context the concept of prudent (responsible) consumption, can be encountered. It means “anticipating the consequences of own consumer behaviors and respecting the entire life cycle of a given good, taking into account its fate beyond the act of purchase and consumption” (Rudawska, 2016, p. 183).

The emergence of the idea of prudent consumption opens the door to the creation of consumption models based on the collective use of goods and services. An example is collaborative consumption, which means that consumers share and exchange what they own instead of buying new products. If necessary, they look for used items, borrow or rent what they need. At the same time, they are ready to share, transfer or sell the things they no longer need, exchange them with others and borrow necessary things from others – for free or for profit (Burgiel, 2015a). In this way, the product is reused and its life cycle is extended. This reduces the number of resources needed to produce products and the amount of waste, which has a positive impact on the environment.

Collaborative consumption as a consumer trend is part of the concept of the sharing economy, which means a system of resource circulation facilitating the sharing of resources still usable in the sense of goods or services, whether for a fee or free of charge, directly between the interested parties or with the participation of an intermediary (cf. Table 2). A key feature of the sharing economy is the process of sharing resources, i.e. granting access to using them jointly. The sharing entity owns or has the right to use the resources it shares. Incomplete use

of owned/held resources, i.e. the possession of “surpluses”, prompts the owner/holder to make the resources available to other consumers, but transactions within the sharing economy do not lead to a change in the ownership of the resources (Sobiecki, 2016; Koźlak, 2017; Frenken, Schor, 2017; Zervas et al., 2017; Rutkowska, 2018; Guyader, Piscicelli, 2019; Mont et al., 2020; Quattrone et al., 2022).

**Table 2.**

*Sharing economy in a narrow and broad sense*

| <b>Sharing economy in a narrow sense</b>  | <b>Sharing economy in a broad sense</b>  |
|---|--|
| Making free or still usable resources available to others (based on sharing)          | Making free or still usable resources available to others not only based on sharing                    |
| Making free or still usable resources available to others only by private individuals | Making free or still usable resources available to others by private individuals and business entities |
| Making free or still usable resources available to others for or without a fee        | Making free or still usable resources available to others for or without a fee                         |
| No intermediary or the intermediary's minor role                                      | Intermediary's substantial role  |
| Emphasis on trust and co-operation in the community                                   | Emphasis on the recipient's economy and convenience  |

Source: Janczewski, 2017.

The idea of collaborative consumption appeared in economically developed Western countries and began to develop dynamically at the turn of the first and second decade of the 21st century. The financial crisis of 2008 and the related need to economize and make better use of resources are often cited as a catalyst for its development (Janczewski, 2017; Kamińska, 2017). At the same time, significant changes in the systems of values were initiated in affluent countries, including the fact that a growing group of consumers began to doubt that a further increase in consumption was satisfactory for them, which coincided with the awareness of environmental degradation and other negative phenomena, such as the weakening of interpersonal bonds. On the other hand, the modern consumer's features are still a desire to maximize satisfying their needs and the so-called compulsion to buy an increasing amount of goods and services. “Our species-specific mix of features, consisting of the desires in the realm of status, indulgence towards one's own weaknesses, propensity for addiction, and above all – the desire for pleasure derived from consumption, keep buyers from concrete changes in consuming. People simply neither want nor like to limit themselves if they do not have to do so” (Burgiel, 2015b, p. 155). Many consumers, especially the wealthy ones, quickly get bored with what they own and they are constantly looking for new ways to satisfy their needs by buying new products (Zgiep, 2014; Burgiel, 2015a).

Currently, the following phenomena are listed as the main causes of collaborative consumption (Mróz, 2013; Burgiel, 2015b):

1. Popularization of the Internet – with the development of the Internet, consumers have gained new, previously unavailable tools for communicating and exchanging information. The development of new technologies and social media has significantly accelerated and intensified processes within sharing economy and collaborative consumption.

2. Consumer prudence, being a result of economic crises and the consequent need to search for new forms of consumption that make it possible to save resources held by households, including the increasing importance of the availability of goods and the possibility of using them without owning them.
3. Increasing environmental awareness – consumers have become more aware of environmental concerns, and there is a growing number of consumers reporting a willingness to “restrain consumption”, which may have a beneficial impact on our planet.

Collaborative consumption is a developmental phenomenon. At the same time it is broad, diverse and characterized by many manifestations. Therefore, three main subsystems (also referred to as dimensions or categories) are distinguished in the collaborative consumption model (Wardak, Zalega, 2013; Burgiel, 2015a, 2015b; Szymańska, 2017; Mazurek-Łopacińska, Sobocińska, 2018; Stępnicka, Wiączek, 2018):

1. Redistribution markets, which are based on the exchange, transfer or resale of products no longer wanted, used or needed by their owners. Owing to that, the products are acquired by those who want to use them further. Depending on the model, the transactions are free or paid in various forms, i.e. in the traditional form of money, but also in points or in digital coins.
2. The collaborative lifestyle, also referred to as co-consumption, which is based on the exchange (free or paid) of services related to tangible goods, as well as broadly understood intangible resources such as time, space or qualifications. The basic manifestation of this lifestyle is the strengthening of existing relationships and the creation of new social ties.
3. Product use systems, also referred to as product service systems, which rely on gaining access to the benefits of using a product, but without the need to purchase it for ownership. Within a given system, certain products are used by different consumers, usually on a loan basis.

Among the basic forms (kinds) of collaborative consumption which have been created and developed in recent years, the following can be mentioned (Wardak, Zalega, 2013; Burgiel, 2015a; Koźlak, 2017; Szymańska, 2017; Mazurek-Łopacińska, Sobocińska, 2018):

- Swapping – exchanging things between private individuals, including swapping clothes or toys (clothing swapping and toy swapping).
- Carpooling – sharing and using the seats available in a private car.
- Home swapping – the exchange of apartments and homes for vacation between individuals from different regions of a country or from different countries.
- Couchsurfing – sharing and using accommodation in private apartments and houses, e.g. during travel.
- Roomsharing – short-term renting of a room on certain dates.

- Cohousing – combining independent apartments with a common space used by all residents, such as a kitchen, laundry, playground. etc.
- Coworking – renting rooms where work can be done, e.g. in a remote form.
- Time banking – Time banks are usually informal organizations that mediate the exchange of services between their members. The currency in these transactions is time, with each hour of work having the same value, regardless of the type of service offered and sought. The “earned” hours can be exchanged for any services offered by other members of the time bank.
- Crowdfunding – a form of raising capital to cover the costs associated with various social and business ventures. These projects are funded by the communities organized around them.

#### **4. Collaborative consumption in Poland and Generation Z**

The question arises to what extent the concept of collaborative consumption in its contemporary sense will be accepted in countries such as Poland. Consumer behaviors in our country are certainly marked by the situation before 1989, i.e. functioning in a centrally planned economy. The use of common goods was imposed from above, compulsory and obligatory (Zgiep, 2014). There was a widespread shortage of goods and services offered on the market, and due to that difficulties occurred in meeting basic consumer needs. Looking for used things and borrowing them from relatives or neighbors was a compulsion, not a conscious and voluntary choice dictated, for example, by ecological reasons. This certainly contributed to the subsequent increased desire to acquire goods for ownership rather than use those made available by other consumers. Currently, like in other countries, the possession of certain material goods (a car or a single-family house) is still an indication of the material and social status in Poland, although on the other hand, it is increasingly emphasized that consumers can also begin to appreciate the benefits of having access to and using goods instead of buying and owning them (Kamińska, 2017).

Changes in the household environment, as well as the accompanying political, economic, social or cultural consequences, lead to incidental reactions or permanent modifications of consumer behaviors. Some members of the society accept the changes, but the extent and level of acceptance of trends in individual societies will vary and depend on social norms and values, culture, tradition, consumer awareness, perception of economic and social phenomena, as well as on the degree of economic development of the country or region. A special group of consumers in terms of the current state and prospects of development of collaborative consumption in Poland are representatives of the so-called Generation Z. This is due to the fact

that collaborative consumption and the sharing of things related thereto are more popular among younger age groups, including Generation Z (Zgiep, 2014).

Generation Z, or New Millennials, are people born after 1994 (Eisenstadt, 2003; Erickson, 2008; Tulgan, 2009; Wątroba, 2017). The Millennials also include the previous group – Generation Y, i.e. people born between 1980 and 1994. Generation Z is a group of people of similar age, in a similar phase of their lives, and at the same time they are a specific “link in biological genealogy and cultural genealogy”. They are distinguished by growing up in a specific economic, political, socio-cultural and technical-technological context (cf. Table 3) that creates the so-called cohort effect, i.e. the formation of certain attitudes – the generational “personality” based on the experience of similar events and collective memories (Winograd, Hais, 2008; Espinoza, Schwartzbart, 2018; Espinoza, Ukleja, 2018; Lipka, 2019; Maciołek, 2019). The Millennials’ behaviors are confronted with even earlier generations, i.e. Baby Boomers (assumed to have been born between 1945 and 1964) and Generation X (born from the mid-1960s to the late 1980s) (Wątroba, 2017).

**Table 3.**  
*The context of Millennials’ growing up*

| <b>Context</b>                             | <b>Components</b>   |
|--|---|
| <b>Economic context</b>                    | Ambiguity; uncertainty; economic polarization/increasing social inequalities; awareness of shrinking domestic labor resources; multi-optionality; flexibility; mobility; need to adapt to change; individualization/personalization; co-creation; reliance on market research; speed of action; focus on quick results; impatience; presentism; just-in-time actions; increasing importance of the service sector; shortening of the life cycle of products/services; creativity; innovation; changing jobs; importance of participation in rivalry; not expecting economic security from the state; remaining subject to viral, participatory, interactive, network marketing; reduced consumer and employee loyalty; common occurrence of atypical forms of employment; non-employmentism; desire to integrate work with leisure time; exposure to underemployment; need for temporary use of specific goods instead of ownership |
| <b>Political context</b>                   | Global perception of the world; globalization of terrorism; freedom of choice; pragmatic optimism; coherence of consumer and corporate values; pursuit of sustainable development; environmental protection movements; need for authenticity and transparency   |
| <b>Socio-cultural context</b>              | Diversity; ethical heterogeneity; independence; need for affiliation, meaning, development and achievement; recognition of otherness; openness to social problems; social responsibility; social exclusion; mass and intensive information exchange; cultural fragmentation; consumption of the media “here and now”; expectation of hedonism; intense experiences, experience; ludic attitudes; non-massiveness; acceptance of goals and their modification to one’s own visions; sense of social security; spending time with parents at home; having working mothers; trust; optimism; expectation of achievement; oversocialization; subjectivity; co-decision-making; high status of cyber-popularity; promotion of collective actions; relativization of systems of values and authorities  |
| <b>Technical and technological context</b> | Digitalization; dissemination of digital technologies; multimedia; use of the cloud; ubiquity of the Internet as a natural means of communication in leisure, education and work; irrelevance of spatial barriers; constant access to feedback; sharing of knowledge; high divisibility of attention; multitasking; high rank of virtual communities and social media; networking; fusion of online and offline identities; mobile phones; text messages; use of e-commerce   |

Source: developed based on Lipka, 2019.

## 5. Results of empirical research

In order to identify and characterize manifestations of and motives for the involvement of representatives of Generation Z in collaborative consumption, primary quantitative research was conducted. The research used an online survey method consisting of closed questions and a metric. The survey was carried out in the period of May-June 2024 with the participation of 168 students of the University of the National Education Commission in Krakow, representing Generation Z.

Among the respondents, women accounted for 61.9%, while men accounted for 38.1%. Their financial situation was generally average (41.7%). 13.1% of the respondents described their material situation as very good, 19.6% as good, 19.0% as bad, and 6.5% as very bad. Almost every fourth respondent came from a city of over 500 thousand inhabitants (24.4%), and every fifth – from the countryside (19.6%). The rest came from towns and cities of less than 10 thousand inhabitants (14.9%), 11-50 thousand inhabitants (15.5%), 51-100 thousand inhabitants (11.9%) and 101-500 thousand inhabitants (13.7%).

The survey covered the following issues: the knowledge of the concepts related to collaborative consumption, the importance of owning products and the readiness to engage in collaborative consumption, the participation in and the assessment of forms of collaborative consumption, the motives for participation in collaborative consumption.

The following research hypotheses were adopted:

1. The level of the knowledge of the concept of collaborative consumption in the theoretical context, i.e. the concept itself and the concepts related thereto, among the representatives of Generation Z is poor.
2. The Generation Z representatives' inclination to share a product with others within collaborative consumption decreases with a rise in the product worth.
3. The readiness of the representatives of Generation Z to participate in collaborative consumption is higher in the case of forms realized with friends compared to those realized with strangers.
4. The participation in and the assessment of collaborative consumption initiatives and activities by Generation Z vary depending on the consumption forms.
5. Among the motives for participation in collaborative consumption by Generation Z representatives, the economic motives are the most important.

### 5.1. Knowledge of concepts related to collaborative consumption

In the survey the respondents were asked to determine their level of familiarity with the concepts of collaborative consumption, co-consumption and shared consumption, and it was not indicated in any way that these concepts were identical and could therefore be used interchangeably. It turned out that the respondents' knowledge of the concept of collaborative

consumption was very poor. Only 7.7% of them said they knew the concept and its meaning. Twice as many respondents admitted having heard about collaborative consumption, but they did not know exactly what it meant (15.5%). In turn, more than  $\frac{3}{4}$  of the respondents did not know the concept at all (76.8%). At the same time, almost every third respondent said that they knew the concept of shared consumption (32.7%), and a little less – of co-consumption (29.2%). On the other hand, almost half of the respondents heard something about these concepts, but they did not know their exact meaning – 45.8% (shared consumption) and 52.4% (co-consumption), respectively (cf. Table 4). There is a noticeable disparity in the knowledge of the concept of collaborative consumption and of the terms used interchangeably (shared consumption and co-consumption) in favor of the latter. It is worth noting that the answers were declarative. It is likely that the respondents treated co-consumption and shared consumption intuitively, and their actual knowledge of the essence of the concepts under analysis cannot be determined for sure.

**Table 4.**

*Knowledge of collaborative consumption and identical concepts*

| Item                             | I know and I know what it means | I have heard something, but I don't know exactly what it means | I don't know |
|----------------------------------|---------------------------------|--|--------------|
| <b>Collaborative consumption</b> | 7.7 %                           | 15.5 %   | 76.8 %       |
| <b>Co-consumption</b>            | 32.7 %                          | 45.8 %   | 21.4 %       |
| <b>Shared consumption</b>        | 29.2 %                          | 52.4 %   | 18.5 %       |

Source: own studies.

The research also identified the knowledge of the English-language terms describing the forms of collaborative consumption, such as carpooling, home swapping, couchsurfing, swap parties, bookcrossing, time banks and crowdfunding. It is worth mentioning that the essence of these concepts was not explained to the respondents in Polish. The respondents were only asked to determine the level of their knowledge of the English terms. The survey results indicate that the level of the knowledge of these concepts is varied, but generally quite low. In the case of terms such as carpooling, home swapping, couchsurfing and time banks, about  $\frac{3}{4}$  of the respondents said they did not know them. The relatively best known term was time banks – 14.9% of the respondents, while 13.1% had heard of it, but did not know exactly what it was about. When it comes to home swapping, the percentages of indications were 8.9% and 18.5%, carpooling – 8.9% and 13.7%, couchsurfing – 7.1% and 19.6%, respectively. It was a little better in the case of bookcrossing. One in five respondents said they knew the concept (20.2%), and about a quarter had heard something about it (26.2%). On the other hand, about half of those surveyed did not know the concept (53.6%). The only exception is the relatively well-known concept of crowdfunding. Almost every second respondent declared their knowledge of it (45.8%), slightly less had heard about it, but did not know it exactly (41.7%), while only 12.5% did not know the concept at all (cf. Table 5). Despite the generally poor knowledge of the above terms, in the further part of the research it turned out, as will be discussed below, that the respondents did know and in some cases positively assessed the forms of collaborative consumption, and their ignorance concerned only the English counterparts.

**Table 5.***Knowledge of English terms for forms of collaborative consumption*

| Form of collaborative consumption | I know and I know what it means | I have heard something, but I don't know exactly what it means | I don't know |
|-----------------------------------|---------------------------------|--|--------------|
| <i>Carpooling</i>                 | 8.9 %                           | 13.7 %   | 77.4 %       |
| <i>Home Swapping</i>              | 8.9 %                           | 18.5 %   | 72.6 %       |
| <i>Couchsurfing</i>               | 7.1 %                           | 19.6 %   | 73.2 %       |
| <i>Swap parties</i>               | 10.7 %                          | 22.0 %   | 67.3 %       |
| <i>Bookcrossing</i>               | 20.2 %                          | 26.2 %   | 53.6 %       |
| <i>Time banks</i>                 | 14.9 %                          | 13.1 %   | 72.0 %       |
| <i>Crowdfunding</i>               | 45.8 %                          | 41.7 %   | 12.5 %       |

Source: own studies.

## 5.2. Importance of owning products and readiness to engage in collaborative consumption

The respondents were asked about the importance of owning products during their use. The survey results revealed large differences in responses depending on the type of product, i.e. whether it was expensive or cheap. The respondents attached the highest importance to product ownership in the case of expensive products, regardless of whether the product was used frequently (77.4%) or only occasionally (67.3%). They declared that ownership was less important if the products were cheap – frequent use (33.3%) and occasional use (26.8%). Owning a product was not important for about a fifth of those surveyed in the case of expensive frequently used products (19.6%) and for a little more than a quarter for expensive products they used occasionally (28.0%). At the same time, for more than half of the respondents, ownership was not important for cheap products for frequent and occasional use (55.4% and 59.5%, respectively) (cf. Table 6). It follows from the above that the respondents are less likely to engage in collaborative consumption for products which involve a large financial expenditure on their part. For expensive products, they prefer to own them and they are less likely to make them available to or share them with others as part of collaborative consumption. It is certainly due to concerns that other people will use the product without due care and about the risk of the product getting damaged.

**Table 6.***Importance of owning a product while it is in use*

| Item               |                | Yes    | No, provided that you can use the product in another way (e.g. borrowing it from someone) | Not important |
|--------------------|----------------|--------|---|---------------|
| Expensive products | frequent use   | 77.4 % | 19.6 %  | 3.0 %         |
|                    | occasional use | 67.3 % | 28.0 %  | 4.8 %         |
| Cheap products     | frequent use   | 33.3 % | 55.4 %  | 11.3 %        |
|                    | occasional use | 26.8 % | 59.5 %  | 13.7 %        |

Source: own studies.



Another issue to analyze was the respondents' willingness to engage in various initiatives and activities within collaborative consumption, i.e. free or paid loan of things, free or paid transfer of things, exchange, as well as sale and purchase of used/unnecessary things. Among the 18 different specific behaviors indicated in the questionnaire, including whether they are undertaken with friends or strangers, in 8 cases the respondents declared readiness to participate at the level of above 85%. At the same time, only 3 behaviors were indicated by less than half of the respondents. The most frequently indicated willingness was to: borrow things for free from a friend (95.8%), give used/unnecessary things to a friend (95.2%) or a stranger (94.0%), and sell used/unnecessary things to a stranger (94.0%). The least common forms of behavior are: getting used/unnecessary items from a friend without having to pay for them (47.0%), lending things for free to a stranger (45.8%), and exchanging used/unnecessary items with strangers (25.6%) (cf. Table 7).

The survey results indicate that the respondents were more ready to participate in collaborative consumption in the case of initiatives and activities carried out with friends rather than with strangers. Out of 9 general behaviors indicated in the questionnaire, as many as 7 would be more likely undertaken with friends. This was especially true for lending things to someone (both for free (friend: 88.7 %, stranger 45.8%) and for a fee (89.3% and 51.8%, respectively), as well as for exchanging used/unnecessary things with other people (60.1% and 25.6%).

**Table 7.**  
*Willingness to engage in collaborative consumption*

| Form of collaborative consumption       |                |            | Yes    | No     |
|---|----------------|------------|--------|--------|
| Lending things for free                 | to             | a friend   | 88.7 % | 11.3 % |
|   |                | a stranger | 45.8 % | 54.2 % |
| Borrowing                               | from           | a friend   | 95.8 % | 4.2 %  |
|   |                | a stranger | 86.9 % | 13.1 % |
| Lending things for a fee                | to             | a friend   | 89.3 % | 10.7 % |
|   |                | a stranger | 51.8 % | 48.2 % |
| Borrowing                               | from           | a friend   | 79.2 % | 20.8 % |
|   |                | a stranger | 74.4 % | 25.6 % |
| Free transfer of used/unnecessary items | to             | a friend   | 95.2 % | 4.8 %  |
|   |                | a stranger | 94.0 % | 6.0 %  |
| Getting used/unnecessary items for free | from           | a friend   | 47.0 % | 53.0 % |
|   |                | a stranger | 50.6 % | 49.4 % |
| Exchanging used/unnecessary things      | with friends   |            | 60.1 % | 39.9 % |
|   | with strangers |            | 25.6 % | 74.4 % |
| Selling used/unnecessary items          | to             | a friend   | 91.1 % | 8.9 %  |
|   |                | a stranger | 94.0 % | 6.0 %  |
| Buying used/unnecessary items           | from           | a friend   | 72.0 % | 28.0 % |
|   |                | a stranger | 67.3 % | 32.7 % |

Source: own studies.

### 5.3. Participation in and assessment of forms of collaborative consumption

An important aspect of the survey was to find out whether the respondents and their families/friends engaged in specific forms of collaborative consumption undertaken using special websites, and how they assessed them. As shown earlier, the respondents had a relatively poor knowledge of the English terms defining the forms of collaborative consumption, especially such as carpooling, home swapping, couchsurfing, and swap parties. In this part of the research, however, it turned out that they generally knew such forms (this time described in Polish), and assessed some of them positively, whereas their ignorance concerned only the English terms.

The survey results indicate that the largest and at the same time the dominant part of the respondents have had an experience of sharing/using things (e.g. in the form of lending/borrowing tools) among their family and friends (92.9%). This is a phenomenon that can be treated as a traditional manifestation of collaborative consumption. It has commonly been around since the dawn of humanity, and so it actually had existed long before the concept appeared. The other forms were indicated much less often. Among their friends and families, 44.0% of the respondents had met with sharing/using free seats in cars (carpooling) and slightly less – 41.7% – with swapping things. A third of the respondents had met with couchsurfing (33.9%). In turn, one in five of them had had an experience with home swapping (22.6%), exchange of services in leisure time (time banking) (22.6%) and raising capital to cover the costs of social/business projects (crowdfunding) (20.2%) (cf. Table 8).

**Table 8.**

*Participation of family/friends in collaborative consumption*

| Form of collaborative consumption                  | Yes    | No     |
|--|--------|--------|
| Carpooling   | 44.0 % | 56.0 % |
| Home swapping                                      | 22.6 % | 77.4 % |
| Couchsurfing                                       | 33.9 % | 66.1 % |
| Sharing/using things, e.g. lending/borrowing tools | 92.9 % | 7.1 %  |
| Swapping items                                     | 41.7 % | 58.3 % |
| Time banking                                       | 22.6 % | 77.4 % |
| Crowdfunding                                       | 20.2 % | 79.8 % |

Source: own studies.

When it comes to the respondents' participation in such forms of collaborative consumption, the results were very similar to the forms they observed among their family and friends. A vast majority of those surveyed declared that they shared/used things by lending or borrowing them (94.0%). Next came carpooling (41.7%) and swapping (40.5%), followed by couchsurfing (28.6%), time banking (25.0%) and crowdfunding (22.6%). Home swapping (6.5%) was definitely the least frequently indicated form (cf. Table 9).

**Table 9.***Respondents' participation in collaborative consumption*

| Form of collaborative consumption                  | Yes    | No     |
|--|--------|--------|
| Carpooling   | 41.7 % | 58.3 % |
| Home swapping                                      | 6.5 %  | 93.5 % |
| Couchsurfing                                       | 28.6 % | 71.4 % |
| Sharing/using things, e.g. lending/borrowing tools | 94.0 % | 6.0 %  |
| Swapping items                                     | 40.5 % | 59.5 % |
| Time banking                                       | 25.0 % | 75.0 % |
| Crowdfunding                                       | 22.6 % | 77.4 % |

Source: own studies.

The respondents' participation in individual forms of collaborative consumption is related to the assessment of the forms. The respondents very positively (82.7%) assessed sharing/using things (lending/borrowing), which – as a reminder – is a common phenomenon among them. Carpooling, used by them very often, was also positively assessed (71.4%). Time banking (67.9%) was ranked third, even though, as already mentioned, up till then only one in five of those surveyed had used it. It seems therefore that this form of collaborative consumption has great potential for development. The other activities are characterized by a clear advantage of negative ratings over positive ones, including swapping, for which only 31.5% ratings were positive, couchsurfing – 30.4%, crowdfunding – 28.0%, and home swapping – 25.0% (cf. Table 10).

**Table 10.***Assessment of collaborative consumption*

| Form of collaborative consumption                  | Positive | Negative | Don't know |
|--|----------|----------|------------|
| Carpooling   | 71.4 %   | 22.0 %   | 6.5 %      |
| Home swapping                                      | 25.0 %   | 60.7 %   | 14.3 %     |
| Couchsurfing                                       | 30.4 %   | 60.7 %   | 8.9 %      |
| Sharing/using things, e.g. lending/borrowing tools | 82.7 %   | 12.5 %   | 4.8 %      |
| Swapping items                                     | 31.5 %   | 54.8 %   | 13.7 %     |
| Time banking                                       | 67.9 %   | 19.6 %   | 12.5 %     |
| Crowdfunding                                       | 28.0 %   | 58.9 %   | 13.1 %     |

Source: own studies.

#### 5.4. Reasons to engage in collaborative consumption

The consumer's propensity to demonstrate certain behaviors in collaborative consumption is determined by his/her motivation, i.e. the inner readiness to take certain actions, which is triggered by a set of specific factors. The basic groups of motives that were investigated are economic, environmental and social ones. Economic motives include financial benefits (profits/savings), economic duress, an opportunity to get rid of unnecessary things. Environmental motives are about avoiding waste and caring for the natural environment. Social motives, on the other hand, include the belief that one should help others, as well as the expectation of reciprocation from the other party. The survey results indicate that the very diverse forms of collaborative consumption are triggered by different motives (cf. Table 11).

**Table 11.**  
*Reasons to engage in collaborative consumption*

| Form of collaborative consumption                    | Economic motives                    |                 |  | Environmental motives |  | Social motives                    |   |
|--|-------------------------------------|-----------------|--|-----------------------|--|-----------------------------------|---|
|  | Economic benefits (profits/savings) | Economic duress | Opportunity to get rid of unnecessary things | Avoiding waste        | Concern about the state of the natural environment | Belief that we should help others | Expectation of reciprocation from the other party |
| Lending to somebody                                  | x                                   | x               | x  | 16.1 %                | 2.4 %  | 89.3 %                            | 78.6 %  |
| Borrowing things for free from somebody              | 78.6 %                              | 72.0 %          | x  | 12.5 %                | 4.2 %  | x                                 | x   |
| Lending things for a fee to somebody                 | 88.1 %                              | 46.4 %          | x  | 11.3 %                | 1.8 %  | 60.7 %                            | 39.9 %  |
| Borrowing from somebody                              | 53.0 %                              | 49.4 %          | x  | 7.7 %                 | 4.8 %  | x                                 | x   |
| Giving someone used/unnecessary things for free      | x                                   | x               | 85.1 %                                       | 88.1 %                | 6.5 %  | 94.0 %                            | 73.8 %  |
| Getting used/unnecessary things from others for free | 82.1 %                              | 79.8 %          | x  | 14.9 %                | 4.2 %  | x                                 | x   |
| Exchanging used/unnecessary things with other people | 58.3 %                              | 58.9 %          | 80.4 %                                       | 78.6 %                | 5.4 %  | 19.6 %                            | 7.1 %   |
| Selling used/unnecessary things to someone           | 94.6 %                              | 41.7 %          | 97.0 %                                       | 29.2 %                | 1.8 %  | 56.0 %                            | 38.1 %  |
| Buying used/unnecessary items from someone           | 47.6 %                              | 45.8 %          | x  | 19.6 %                | 1.2 %  | x                                 | x   |

Source: own studies.

When engaging in collaborative consumption, the respondents attach great importance to economic factors, including financial benefits in the form of earned income or savings (without having to spend funds), but also to the factor related to economic duress, which results from finding oneself in a certain (unfavorable) material situation. Financial benefits in the form of income played a dominant role in collaborative consumption forms related to payment, namely in the case of selling used/unnecessary things to someone (94.6%) and lending things to others for a fee (88.1%). The other motives played a much smaller role in the above cases (except for the opportunity to get rid of unnecessary items as a reason for the sale, as indicated by 97.0% of the respondents). For example, when selling unnecessary things to someone, only 56.0% of those surveyed justified it with the belief that others should be helped (a social factor), and in the case of lending various things to someone for a fee, the percentage was 60.7%. The high ranking of the motive in the form of the opportunity to get rid of unnecessary things proves that – although the importance of helping others was indeed pointed out – the respondents are motivated primarily by their own convenience.

Financial benefits in the form of savings were most important in the case of getting used/unnecessary things from someone for free (82.1%) and borrowing things from someone (78.6%) without paying. The above two manifestations of collaborative consumption very often appeared also in situations of economic duress as a motive for undertaking such actions

(79.8% and 72.0%, respectively). The significance of this motive stems from the belief that some things are not worth buying, especially in a situation where they are used only occasionally and, additionally, can be received or borrowed from others free of charge.

The next two factors, identified as environmental, were linked to the concern about the state of the natural environment and the avoidance of waste related thereto. The results of the survey indicate that the concern about the natural environment, being an essential pillar of the concept of collaborative consumption in Western countries, was of minimal importance and was the least frequently indicated motive for collaborative consumption among the respondents. The percentage of indications for this motive in the case of individual forms of collaborative consumption did not exceed as little as 6.5% (which was the case for an unpaid transfer of used/unnecessary things to others). Much more often, at least in relation to some forms of collaborative consumption, there was a motive in the form of a desire to avoid waste. Its greater popularity was probably due to the more specific character and to the fact that the expected effects of the actions were felt already at the moment they were taken up by the respondents (I am giving something I no longer need/use to someone, so I am not wasting it here and now), compared to the concept of caring for the state of the natural environment, the effects of which cannot be noticed immediately. Avoiding waste was most often indicated in the case of giving used/unnecessary things to someone for free (88.1%) and exchanging such things with other people (78.6%). In the case of other forms of collaborative consumption, no more than 30% of those surveyed indicated the importance of this motive.

Among the social motives that decide collaborative consumption were the belief that one should help others and the expectation of reciprocation from the other party. The former definitely dominated in the case when things were transferred or lent to someone for free (indicated by 94.0% and 89.3% of the respondents, respectively). It was less important in the case of a paid loan (60.7%) or selling things to someone (56.0%) because, as already mentioned, the economic motives were the most important then. In turn, the expectation of reciprocation from the other party as a social motive appeared most often in the case of unpaid forms of collaborative consumption, including lending or giving things to someone for free (78.6% and 73.8%, respectively). It was less often indicated when paid actions that involve lending (39.9%) or selling things (38.1%) were taken up.

## **6. Summary and conclusions**

The emergence of the concept of collaborative consumption in the first years of the 21st century was the effect of the popularization of the Internet as an information and communication medium (facilitating the implementation of various forms of consumption), consumer prudence (resulting from economic crises and the need to search for new forms of

consumption related thereto), as well as the increase in environmental awareness. The idea of collaborative consumption appeared in economically developed Western countries. Consumers look for solutions to meet basic but also higher-level needs without owning products, as the needs can be satisfied through various forms of collaborative consumption. The question remains whether and to what extent this idea will be accepted in countries such as Poland, where the ownership of goods is still a sign of the material and social status. Moreover, also in economically developed countries, not all consumers are convinced by the concept of giving up the ownership of goods in favor of the possibility of using them based on their availability only.

Collaborative consumption seems to be more popular among younger age groups, including the representatives of Generation Z born after 1994, who grew up in a specific economic, political, socio-cultural, and technical-technological context. In connection with the above, empirical research was carried out, thanks to which the level of knowledge of the concept among the representatives of Generation Z, the ways of the generation participation in various forms of collaborative consumption, the assessment of its individual forms, and the motives for engaging in various forms of collaborative consumption were determined. Five research hypotheses were adopted, which were confirmed by the survey results.

According to hypothesis 1, the level of knowledge of the concept of collaborative consumption among the representatives of Generation Z was low. The knowledge of identical concepts, such as co-consumption and shared consumption, was a little better, although it is impossible to be sure of the actual knowledge of the respondents in this respect. Similarly, the knowledge of the English-language terms defining individual forms of collaborative consumption was poor, especially of terms such as carpooling, home swapping, couchsurfing and time banking.

The Generation Z representatives demonstrated varied readiness to engage in collaborative consumption depending on the worth of the product. It turned out that, as the product worth increased, the inclination to share it with other people as part of collaborative consumption decreased (hypothesis 2). At the same time, the readiness to participate in collaborative consumption was higher in the case of its forms realized with friends compared to those realized with strangers. This was especially true for lending things to someone (both with and without a fee), as well as for exchanging used/unnecessary things with other people (hypothesis 3).

According to hypothesis 4, the participation of Generation Z representatives and their assessment of the initiatives and activities included in collaborative consumption varied depending on its form. On the one hand, the traditional sharing/using things, which is done by almost all respondents in the form of lending/borrowing, can be indicated here, but on the other hand – the very rare home swapping is pointed to as well. In turn, among the motives for participation in collaborative consumption, the economic motives were of primary importance, while the environmental and social motives were viewed as much less significant, even though

they are immensely important from the point of view of sustainable development and responsible consumption (hypothesis 5).

Considering the above, it is difficult to determine unequivocally whether collaborative consumption will become a standard in consumer behaviors that will replace traditional consumption based on product ownership. It seems more reasonable to believe that it will be a phenomenon complementary to traditional consumption. Moreover, it can be expected that the Generation Z representatives, as they enter adulthood and improve their material status, even if they are now in favor of collaborative consumption and engage in its various forms, will tend to give up this particular consumption type in favor of ownership-based consumption, and their specific age group will be replaced by next younger generations. On the other hand, collaborative consumption cannot be treated as a trend that will lose its relevance or even disappear in the near future. This is supported by the indisputable reasons for its current and future development, i.e. the popularity of the Internet, consumer prudence and environmental awareness.

## References

1. Algar, R. (2007). *Collaborative consumption*. Retrieved from: <http://www.oxygen-consulting.co.uk/insights/collaborative-consumption/>, 15.09.2024.
2. Anwar, S.T. (2023). The sharing economy and collaborative consumption: Strategic issues and global entrepreneurial opportunities. *Journal of International Entrepreneurship*, Vol. 21, pp. 60-88.
3. Bainbridge, J. (2013). *Understanding Collaborative Consumption*. Retrieved from: [http://www.campaignlive.co.uk/article/1208887/understandingcollaborative-consumption?src\\_site=marketingmagazine#](http://www.campaignlive.co.uk/article/1208887/understandingcollaborative-consumption?src_site=marketingmagazine#), 15.09.2024.
4. Bardhi, F., Eckhardt, G.M. (2012). Access-Based Consumption: The Case of Car Sharing. *Journal of Consumer Research*, Vol. 39, Iss. 4, pp. 881-898.
5. Botsman, R., Rogers, R. (2010). *What's Mine is Yours: The Rise of Collaborative Consumption*. New York: Harper Collins.
6. Burgiel, A. (2015a). Determinanty i perspektywy upowszechnienia konsumpcji wspólnej w Polsce. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, No. 231, pp. 7-28.
7. Burgiel, A. (2015b). Wspólna konsumpcja jako alternatywny model spożycia i jej przejawy w zachowaniach konsumentów. In: E. Kieźel, S. Smyczek (Eds.), *Zachowania konsumentów. Procesy unowocześniania konsumpcji*. Warszawa: Oficyna a Wolters Kluwer business, pp. 153-192.

8. Bylok, F. (2013). *Konsumpcja. Konsument i społeczeństwo konsumpcyjne we współczesnym świecie. Studium socjologiczne*. Katowice: Śląsk.
9. Bywalec, Cz. (2007). *Konsumpcja w teorii i praktyce gospodarowania*. Warszawa: PWN.
10. Bywalec, Cz. (2010). *Konsumpcja a rozwój gospodarczy i społeczny*. Warszawa: C.H.Beck.
11. Bywalec, Cz. (2017). *Gospodarstwo domowe. Ekonomia, finanse, konsumpcja*. Kraków: Uniwersytet Ekonomiczny w Krakowie.
12. Dąbrowska, A., Janoś-Kresło, M. (2018). Collaborative Consumption as a Manifestation of Sustainable Consumption. *Problemy zarządzania – Management Issues, Vol. 16, No. 3(75)*, pp. 132-149.
13. Eisenstadt, S.N. (2003). *From Generation to Generation*. New Brunswick: Transaction Publishers.
14. Erickson, T. (2008). *Plugged In. The Generation Y Guide to Thriving at Work*. Cambridge, MA: Harvard Business Review Press.
15. Espinoza, Ch., Schwartzbart, J. (2018). *Milenialsi zarządzają*. Warszawa: PWN.
16. Espinoza, Ch., Ukleja, M. (2018). *Zarządzanie milenialsami*. Warszawa: PWN.
17. Felson, M., Spaeth, J.L. (1978). Community structure and collaborative consumption: A Routine Activity Approach. *American Behavioral Scientist, Vol. 21, Iss. 4*, pp. 614-624.
18. Frenken, K., Schor, J. (2017). Putting the sharing economy into perspective. *Environmental Innovation and Societal Transitions, Vol. 23*, pp. 3-10.
19. Gansky, L. (2010). *The Mesh: Why the Future of Business Is Sharing*. New York: Penguin Books.
20. Garcia-Rodriguez, F.J., Gutierrez-Tano, D., Ruiz-Rosa, I., Baute-Diaz, N. (2022). *New Models for Collaborative Consumption: The Role of Consumer Attitudes Among Millennials*. Retrieved from: <https://journals.sagepub.com/doi/10.1177/21582440221140389>, 12.09.2024.
21. Guyader, H., Piscicelli, L. (2019). Business model diversification in the sharing economy: The case of GoMore. *Journal of Cleaner Production, Vol. 215*, pp. 1059-1069.
22. Janczewski, J. (2017). Konsumpcja współdzielona a przedsiębiorczość. *Przedsiębiorczość – Edukacja, No. 13*, pp. 262-274.
23. Kamińska, M. (2017). Gospodarka współdzielenia w Polsce – rezygnacja z posiadania na rzecz konsumpcji opartej na dostępie. *Przedsiębiorstwo we współczesnej gospodarce – Teoria i Praktyka, No. 3*, pp. 165-177.
24. Koźlak, A. (2017). Sharing economy jako nowy trend społeczno-gospodarczy. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, No. 489*, pp. 171-182.
25. Lamberton, C. (2016). Collaborative consumption: a goal-based framework. *Current Opinion in Psychology, Vol. 10*, pp. 55-59.
26. Lipka, A. (2019). *Ryzyko (zagrożenia i szanse) zatrudniania Milenialsów. Zarządzanie kapitałem ludzkim „po nowemu”*. Warszawa: CeDeWu.



27. Lipowski, M., Sobczyk, G., Bondos, I., Słowikowska, I. (2020). *Konsumpcja w Polsce. Uwarunkowania, zmiany i współczesne trendy*. Lublin: Wydawnictwo Uniwersytetu Marii Curie-Skłodowskiej.
28. Maciołek, D. (2019). *Niepokorne pokolenie milenium. Czego pragnie na rynku pracy?* Warszawa: Difin.
29. Małecka, A. (2016). Konsumpcja kolaboratywna a rozwój gospodarczy – perspektywa makro i perspektywa przedsiębiorstwa. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego, No. 43/2*, pp. 167-175.
30. Małecka, A., Mitręga, M. (2015). Konsumpcja kolaboratywna – wyzwania pomiarowe i menedżerskie w kontekście tzw. ride sharing. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego, No. 39/2*, pp. 139-150.
31. Małecka, A., Mitręga, M. (2017). Zróżnicowanie form konsumpcji kolaboratywnej – teoria i wstępne wyniki badań. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, No. 330*, pp. 119-127.
32. Mazurek-Łopacińska, K., Sobocińska, M. (2018) Zachowania konsumentów oparte na współdzieleniu i ich konsekwencje marketingowe. *Marketing i Rynek, No. 4*, pp. 394-404.
33. Mont, O., Palgan, Y.V., Bradley, K., Zvolška, L. (2020). A decade of the sharing economy: Concepts, users, business and governance perspectives. *Journal of Cleaner Production, Vol. 269*. Retrieved from: <https://www.sciencedirect.com/science/article/pii/S0959652620322629?via%3Dihub>, 11.09.2024.
34. Mróz, B. (2013). *Konsument w globalnej gospodarce. Trzy perspektywy*. Warszawa: Szkoła Główna Handlowa.
35. Quattrone, G., Kusek, N., Capra, L. (2022). A global-scale analysis of the sharing economy model – an AirBnB case study. *EPJ Data Science, No. 11, 36*. Retrieved from: <https://epjdatascience.springeropen.com/articles/10.1140/epjds/s13688-022-00349-3#citeas>, 14.09.2024.
36. Rudawska, I. (2016). Ekonomia dzielenia się, czyli konsumpcja współdzielona i inne formy alternatywnego dostępu do dóbr. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, No. 254*, pp. 181-189.
37. Rutkowska, A. (2018). Społeczno-ekonomiczne przejawy sharing economy. *Zarządzanie i Finanse. Journal of Management and Finance, Vol. 16, No. 4/1*, pp. 165-178.
38. Sobiecki, G. (2016). Sharing economy – dylematy pojęciowe. In: M. Poniatowska-Jaksch, R. Sobiecki (Eds.), *Sharing economy (gospodarka współdzielenia)*. Warszawa: Oficyna Wydawnicza SGH, pp. 27-38.
39. Stępnicka, N., Wiączek, P. (2018). Konsumpcja współdzielona – mit czy rzeczywistość? *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach, No. 377*, pp. 125-135.
40. Szymańska, A.I. (2017). Sharing economy jako nowy trend w zachowaniach konsumentów. *Marketing i Rynek, No. 9*, pp. 417-425.

41. Tulgan, B. (2009). *Not Everyone Gets a Trophy. How to Manage Generation Y*. San Francisco: Jossey-Bass.
42. Wardak, P., Zalega, T. (2013). Konsumpcja kolaboratywna jako nowy trend konsumencki. *Studia i Materiały. Wydział Zarządzania Uniwersytetu Warszawskiego, No. 16*, pp. 7-32.
43. Wątroba, W. (2017). *Transgresje międzypokoleniowe późnego kapitalizmu*. Wrocław: Uniwersytet Ekonomiczny we Wrocławiu.
44. Winograd, M., Hais, M.D. (2008). *Millennial Makeover. My Space, YouTube, and the Future of American politics*. New Brunswick: Rutgers University Press.
45. Włodarczyk, K. (2018). Konsumpcja kolaboratywna w dobie globalizacji konsumpcji. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, No. 530*, pp. 26-36.
46. Zalega, T. (2012). *Konsumpcja. Determinanty. Teorie. Modele*. Warszawa: PWE.
47. Zalega, T. (2020). The Sharing Economy and the Behaviour of Young Polish Singles: The Case of BlaBlaCar. *Gospodarka Narodowa, No. 4(304)*, pp. 105-134.
48. Zervas, G., Proserpio, D., Byers, J.W. (2017). The Rise of the Sharing Economy: Estimating the Impact of Airbnb on the Hotel Industry. *Journal of Marketing Research, Vol. 54, Iss. 5*, pp. 687-705.
49. Zgiep, Ł. (2014). Sharing economy jako ekonomia przyszłości. *Myśl Ekonomiczna i Polityczna, No. 4(47)*, pp. 193-205.

## THE ROLE OF QUALITATIVE METHODS IN SOCIAL RESEARCH: ANALYZING PHENOMENA BEYOND NUMBERS

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**Purpose:** The paper aims to explore the role and significance of qualitative methods in the research process, particularly focusing on their ability to interpret and understand complex social phenomena. It highlights the complementarity between qualitative and quantitative approaches and their joint use in comprehensive research.

**Design/methodology/approach:** This paper utilizes a theoretical approach to describe and analyze qualitative research methods, including observation, interviews, and group discussions. The discussion is grounded in a comparison with quantitative methods, emphasizing the interpretive and subjective aspects of qualitative research, which allows for a deeper understanding of phenomena.

**Findings:** The paper finds that qualitative methods play a crucial role in providing insights into phenomena that cannot be quantified. It highlights the importance of qualitative research in building theories from observed experiences, the value of respondents' personal experiences, and the essential interaction between researchers and participants. The findings also support the argument that qualitative and quantitative research are complementary, and using both approaches can enhance research outcomes.

**Research limitations/implications:** The paper acknowledges that purely qualitative research may lack generalizability due to its focus on individual or small group data. It suggests future research should continue to integrate both qualitative and quantitative methods to enhance the validity of the results.

**Practical implications:** While not directly aimed at providing commercial or economic recommendations, the findings emphasize the importance of incorporating qualitative methods in research processes to gain richer, more contextually grounded insights that can inform policy-making, social programs, and educational practices.

**Social implications:** The research can influence public attitudes by promoting a more nuanced understanding of social phenomena. It underscores the value of qualitative research in capturing human experiences and behaviors, which could be used to inform social policy and educational reforms.

**Originality/value:** This paper contributes to the field by offering a comprehensive exploration of qualitative research methods, highlighting their relevance in capturing the complexities of social phenomena. It is of value to researchers in social sciences, education, and policy development who seek to integrate qualitative approaches into their research methodologies.

**Keywords:** qualitative research, observation, interviews, social phenomena, research methodology.

**Category of the paper:** Research Paper, Conceptual Paper.

## 1. Introduction

Qualitative research methods, by their nature, delve into the activities undertaken by individuals, allowing for the analysis of newly emerging phenomena and the formulation of new categories and concepts. These methods also enable the development of hypotheses that serve as a foundation for applying quantitative approaches (Konecki, 2000). The scope of qualitative research includes:

- analyzing observed effects and phenomena,
- uncovering the components that form the whole,
- identifying and highlighting connections and relationships,
- describing structures in their entirety,
- interpreting and explaining phenomena, their functions, and meanings.

Unlike quantitative research, which often addresses larger populations, qualitative research typically focuses on individuals or small groups. The research investigates factors whose scale cannot generally be measured. This type of research involves structured interviews or discussions, which are directed and moderated by the researcher to ensure they remain focused on specific topics (Dźwigoł, 2018).

Researchers utilizing qualitative methods caution that their techniques alone should not be considered sufficient for drawing definitive conclusions from qualitative or field research (Cicourel, 1964). Many practices originating from quantitative research may not be suitable for qualitative research. This also ties into the notion that valid social science research must rely on quantifiable information, such as experimental data, random sample surveys, and official statistics, to ensure relevance and generalizability (Denzin, 1970). In contrast, qualitative research, which aims to describe and explain sequences of events, is closely tied to the personal experiences and emotions of both the subjects and the researchers involved.

The essence of qualitative research lies in its focus on interpreting and understanding phenomena rather than explaining them through causal sequences, as is the objective of quantitative research (Skorny, 1974). This paper discusses the role and importance of qualitative methods in research processes, highlighting various methods and emphasizing the importance of combining both qualitative and quantitative approaches in research.

## 2. Framework for qualitative research

The theoretical framework of research findings should be developed, selected, or adapted only at the research stage or even after the research has been completed. This is because, in qualitative research, theoretical justification is not always necessary. The theory plays

a supporting role here, helping to explain the observed phenomena, but it does not dictate what the researcher should be looking for. This approach allows the formulation of theories that are directly connected to the experiences gained during the research process. In contrast to quantitative methods, theory is a conclusion of the research rather than a guide for its direction or validity (Dźwigoł, 2018).

Respondents play a crucial role in qualitative research. For example, in the case of teachers, their professional experience should be highly valued, as many in this profession can provide valuable insights and advice that may assist in solving the research problem. Children and young people, who are often direct witnesses of the phenomena being studied, also represent an important source of information. While their perceptions may sometimes be mistaken, these very errors offer the researcher valuable material for further scientific exploration.

Thus, in qualitative research, it is impossible to strictly separate the researcher from the researched, as both parties play similar roles, especially during the data collection phase. It is important to engage appropriately with respondents, establish a rapport, and treat them as equal partners without placing oneself above them as someone who "knows more".

Qualitative research is often referred to as "soft research" because it employs unstructured techniques and methods, sharply contrasting with the quantitative approach. The results of such research are typically presented in narrative form or as essays, without complex statistical analyses. While the two approaches – qualitative and quantitative – are not mutually exclusive, they are in fact complementary. Qualitative methods explain processes and cause-and-effect relationships, capturing both the personal experiences of the researcher and the participants. For this reason, such research is often called fieldwork, ethnographic, or anthropological; terms such as "ecological" or "micro-ethnographic" research are also used (Dźwigoł, 2018).

It is important to remember that various descriptions and qualitative analyses, without an appropriate approach, may be imprecise and not fully reflect the essence of the phenomenon being studied. This is because they may not accurately represent the respondents' understanding of the variables and indicators involved. This shortcoming is addressed by qualitative methods, which is why most quantitative studies also require a qualitative approach as a complement. This recommendation works in both directions, as purely qualitative research, based for example solely on uncategorised observation or essays without elements of quantitative methods, is also incomplete.

In recent years, numerous studies have focused on the integration of qualitative and quantitative methods with the aim of mutual verification of results. These studies are particularly relevant in the context of digitalisation, sustainable development, and combined methodologies. For example, Dźwigoł (2018) examined the methodological and methodical foundations of contemporary research processes in management sciences, and later, Dzwigol (2020a) developed a triangulation platform in strategic management. His subsequent works (Dzwigol, 2020; Dźwigoł, Trzeciak, 2023) explore innovations in marketing research and pragmatic methodology in management sciences. Researchers have also investigated the

relationship between sustainable development, green logistics, and energy efficiency (Dźwigoł et al., 2021, 2023a, 2023b). These studies highlight the importance of using both qualitative and quantitative methods for a comprehensive and accurate interpretation of complex phenomena.

Continuing the theme of mutual supplementation between qualitative and quantitative methods, other works also emphasise the importance of using combined approaches. For instance, Kwilinski (2019a) proposed a mechanism for assessing the competitiveness of industrial enterprises in the information economy, while in another work, Kwilinski (2019b) examined the implementation of blockchain technologies in accounting. In the study by Kharazishvili et al. (2020), social indicators of sustainable development are analysed, and Kharazishvili et al. (2021) proposed a systemic approach to assessing energy security, using Ukraine as a case study. Moreover, Kharazishvili and Kwilinski (2022) developed a methodology for determining the threshold values of national security indicators using artificial intelligence methods.

Research has also examined the importance of digitalisation in sustainable development. For instance, the work of Kwilinski et al. (2022b) focused on integrative smart grid assessment systems, while more recent studies by Kwilinski et al. (2023a, 2023b) investigated the impact of digital transformations on achieving sustainable development, particularly in the transport sector. The crucial role of urbanisation in environmental growth was also addressed in the study by Kwilinski et al. (2023c), which explored the effects of urbanisation in the context of sustainable development. The work of Kwilinski et al. (2023d) examines the effects of green finance on achieving sustainable development goals, utilising the Spatial Durbin Model.

Finally, the research by Kwiliński et al. (2024) is dedicated to promoting sustainable development goals through digital culture, providing a global research overview in this area. All these studies affirm the significance of combining quantitative and qualitative methods to achieve a deeper understanding of the phenomena being studied and to meet the objectives of sustainable development.

The simultaneous use of quantitative and qualitative methods in research arises from the complexity and uniqueness of the subject matter. However, it is not always appropriate to treat both methods equally in every case of scientific exploration. Doing so would contradict the principle that the choice of methods should depend on the nature of the object being studied and that the object should not be altered to fit predetermined, idealised approaches to data collection and analysis (Dźwigoł, 2018).

### 3. Selected qualitative research methods

#### 3.1. Observation

Studies that rely on observation often provide only a broad and suggestive overview of the collected data (Silverman, 2008). A. Kamiński describes observation as "a unilateral activity, carried out solely by the researcher, who is motivated by the aim to conduct a purposeful, planned, systematic, and critical observation of particular behaviours, objects, etc." (Kamiński, 1974). Similarly, T. Pilch (Pilch, 1977) defines observation as a research activity focused on gathering data through observations.

Observation involves systematically and discreetly observing the objects of study within their natural environment. One classification identifies five types of observation:

- **Categorised:** The researcher uses pre-prepared tools like charts or questionnaires, and observation is based on the data collected from these documents.
- **Uncategorised:** The researcher does not rely on any pre-arranged questionnaires or guidelines, leading to a more spontaneous and free form of observation.
- **Overt:** Subjects are aware that they are being observed, which may cause them to act unnaturally, potentially distorting the information.
- **Participatory:** The researcher immerses themselves in the observed environment, conducting research from within.
- **Direct:** The researcher not only collects data but also verifies its accuracy through other research methods.

In categorised observation, the researcher is well-prepared and familiar with the working conditions. They record findings using pre-structured tools, such as diagrams or questionnaires, noting only what the predefined categories on these tools capture (Altkorn, 1998).

A researcher interacting with a particular community typically adopts one of the following roles:

- Full participant.
- Completely external observer.
- Observer as participant.
- Participant as observer (Konecki, 2000).

When the researcher assumes the role of a participant as an observer, it means they have gained "permission from the group to take part in its activities and observe it in its natural setting" (Konecki, 2000), without having an organisational role in the group (Kostera, 2003). In this position, the researcher faces the challenge of avoiding the interpretation of the group's actions and behaviours, even though "the natural process of perception leads us to automatically categorise the world around us" (Kostera, 2003).

Observation can be seen as one of the most versatile and comprehensive techniques for gathering information. Due to its complexity, it is sometimes mistakenly regarded as a research method. However, this is incorrect, as observation is a fundamental approach to understanding that includes various supplementary techniques. It remains one of the most versatile yet historically and essentially original ways of conducting research. Observation is both a straightforward, spontaneous recording of facts and events and a complex, controlled process involving systematic observation aided by other techniques, such as questionnaires and video or audio recording (Kirk, Miller, 1986).

Through observation, a researcher can gather highly 'natural' and authentic information about the studied community. The most common form of observation is open or free observation, which is particularly valuable in the initial stages of a research project. It helps collect general information about the research subject, which in turn allows for more precise planning of later research stages and the formulation of preliminary issues and working hypotheses.

Another type of observation is systematic direct or indirect observation, which is a more structured and scientific approach. This method involves collecting planned observations over a specific time frame to understand the connections and relationships between phenomena, and to identify the directions and types of processes occurring within social groups or institutions.

Systematic observation requires supporting techniques, and several factors need to be planned, including problematic aspects, timing, and methods of data collection. Problematic aspects involve determining what issues should be observed within the sample population, including the quantity and quality of these observations. For example, processes, traits, reactions, or attitudes may be observed. In cases where processes or transformations are studied, it is important to focus on factors such as the determinants, speed of progression, or intensity of changes under particular conditions. When observing reactions and attitudes, the variables that cause specific reactions and the role of motivation are key. To accurately identify attitudes, it is essential to determine their prevalence and evaluation measures. When scheduling the timing of the observation, the scale of the subject and object being observed must be taken into account. It is critical to avoid conducting observations during extraordinary periods unrepresentative of the usual dynamics of the group or institution.

Participant observation (either overt or covert) (Wikipedia contributors. *Obserwacja (nauki społeczne, n.d.)*) is a specific form of systematic observation, wherein the researcher becomes a member of the observed group in order to observe from within (Altkorn, 1998). This method aims to capture the genuine behaviours and actions of individuals in their 'natural environment.' In overt participant observation, the group is aware that the researcher is observing them, but they are not necessarily informed about the research objectives, which can alter their behaviour (Frankfort-Nachmias, Nachmias, 2001). In covert participant observation, the group is unaware of the researcher's dual role. This method is frequently used in



pedagogical or sociological research to study individual behaviours, where the researcher seeks to observe, record, and interpret the social significance of these behaviours.

In this form of participant observation, the researcher accompanies the subject during everyday tasks and activities over a period of time. The researcher does not only passively observe and take notes but also asks context-based questions to better understand the process or the individual's motives. They may also record observations using photographs, films, or audio recordings. The goal of participant observation is to study the respondents' behaviour within real settings, focusing on situations and events that are natural, rather than artificially created. The researcher assesses the presence of smart organisation principles within the study subjects. To achieve optimal results, the researcher tries to establish direct contact with the subjects, participates in events and situations, and indirectly influences actions or reactions, without directly altering their behaviour.

Participant observation requires the acceptance of the researcher by the group, whether overtly or covertly, as a member with a particular function. Membership within the group allows the researcher to collect richer data compared to other types of observation. However, the researcher risks unconsciously adopting the behaviours, opinions, and reactions of the observed group, which may compromise the objectivity necessary for research.

The main strength of direct observation as a research method lies in its naturalness, expressed in two key aspects:

Observation is a fundamental and natural way for humans to learn about the world.

It allows events to be observed in their undisturbed course, especially when studying human interactions and relationships.

When discussing observation, it is important to recognise its strong connection to the individual characteristics of the observer, including their research intuition and unique ability to understand the world or their subjective worldview. Challenges in this method can be grouped into three categories (Silverman, 2008):

- Perceptual limitations, as human senses can only perceive a limited range of stimuli.
- The emotional attitude of the observer, which may be influenced by personal relationships with the subjects, potentially skewing the freshness and accuracy of observations.
- The observer's cognitive stereotypes, affecting how they interpret phenomena, facts, or relationships.

Unstructured observation, also referred to as non-standardised observation, allows the researcher to observe freely, noticing events, facts, and phenomena in a way that aligns with the overall research aim. Although it offers flexibility, unstructured observation still meets the requirements of scientific observation and is often used in the early stages of educational research, particularly for topics that are little known or previously unexplored (Silverman, 2008).

### 3.2. Interview

Among the primary research methods used within the behavioural sciences, the interview holds a particularly prominent position. Despite its limitations and potential drawbacks, it remains one of the most commonly employed techniques. Compared to other methods, it allows for a more flexible adaptation to the issues at hand, as well as the abilities and needs of the respondents. It provides the opportunity to gain insight into individuals and their concerns, while also developing the researcher's sensitivity to the subjects, much like observation.

Interviews are particularly useful when it is not possible to obtain information or opinions, or to ascertain facts about a particular population through other research methods. This technique involves active engagement from both parties: the interviewer and the interviewee (as the research participant). It is a guided process in which the researcher collects data by asking a range of questions, from formal to informal, to selected respondents in order to gain insights into various issues, such as the participant's thoughts, actions, or emotions (Collis, Hussey, 2003). The interviewer interacts with the respondent, asking questions and encouraging them to discuss the topic under investigation. If there is no interviewer and participants complete the questionnaire themselves, this technique is known as a survey.

The interview can serve as the main method for understanding individuals or as a supplementary tool for data collection, depending on its objectives and the way it is conducted. When structured and executed effectively, interviews can yield valuable information that might be challenging to acquire through other means. This method can be used for various purposes, including:

- Uncovering unknown facts from a reliable source.
- Understanding the interviewee's views and beliefs.
- Learning about the context of described events.
- Collecting personal data about the respondent.

For optimal results, interviews should be combined with observing the respondent. This allows for a direct comparison between their spontaneous, natural behaviour and their verbal responses, offering a more comprehensive understanding of the individual. Such an approach also enables immediate (albeit partial) verification of the accuracy and reliability of the responses.

During interviews, the researcher must depend on the honesty, insight, and objectivity of the respondents. Major distortions in interview results often arise from:

- Poorly worded questions.
- A lack of interviewing skills, which can significantly limit the depth and quality of the information collected.
- Insufficient preparation or knowledge, coupled with the risk that the interviewer's questions may unintentionally impose their own worldview on the respondent.

The final outcome of the research is typically a report based on an analysis of the interview process, which includes answers to the research questions outlined prior to the study, as well as the development of a group discussion scenario. To illustrate findings, discussion group reports often feature direct quotes from participants.

The interpretation of responses is heavily influenced by the personality of the researcher, which may lead to the neglect of certain nuances in the attitudes and experiences of the respondents.

The quality of the research is largely determined by the reliability of the interview scripts (Silverman, 2008). For interviews to yield the necessary data, careful preparation is essential. This preparation should include:

- Clarifying the purpose and scope of the interview.
- Compiling a detailed list of questions that focus on the topic.
- Encouraging the respondent to feel motivated and open to engage in the interview process.

When framing questions, it is advisable to avoid beginning with "Whether?", as this may resemble a test scenario. Instead, start with "What?", "Which?", or "Why?". Responses should be received with genuine interest, empathy, and understanding. It is important not to correct the respondent, nor to display impatience or disregard for their knowledge. The interviewee should feel that their contributions are valued and align with the research objectives.

Standardising research tools is a fundamental requirement for creating a reliable questionnaire (Sztumski, 2005). The combined use of observation and interviews has numerous advantages—for instance, data gathered through one method can help clarify other findings (Hammersley, Atkinson, 2000).

The following types of interviews can be identified:

- Informal interview.
- Questionnaire-based interview.
- Structured (standardised) interview.

### **3.3. Qualitative interview**

In the behavioural sciences, one of the key research methods is the qualitative interview. It involves an interaction between the researcher and the interviewee, where the conversation is directed by the interviewer, who places emphasis on certain themes brought up by the respondent while guiding the overall flow of the dialogue. The interviewer is generally well-prepared, having a plan for the conversation, but it does not involve following a rigid set of pre-determined questions in a specific order. It is crucial for the qualitative interviewer (or survey interviewer) to be well-versed in the subject matter and familiar with the questions that will be asked. If the interviewer is sufficiently prepared, the conversation should progress naturally, resembling a smooth dialogue (Babbie, 2007).

A qualitative interview can be described as a controlled and guided conversation. During this process, the interviewer draws attention to key issues raised by the respondent, while steering the direction of the discussion.

There are various types of interviews:

- Unstructured (free, open-ended) interviews: Here, the interviewer does not rely on a fixed set of questions but instead follows the respondent's lead.
- Semi-structured interviews: These have guidelines on which topics should be discussed, allowing flexibility.
- Structured (standardised) interviews: In this case, the interviewer follows a pre-prepared list of questions in a specific format and order, without deviation.

Interviews are typically recorded to allow for later transcription and analysis.

Semi-structured interviews combine elements of both qualitative and quantitative research methods. They are based on a set of pre-prepared questions, but the interviewer can alter the wording or order of the questions as necessary. This flexibility allows for a deeper exploration of specific topics (Moorhouse, 2000).

The sample used for the research is drawn from a small, defined population, making it appropriate for a qualitative approach that seeks to gather unique insights. The specific nature of the information being sought leads to the use of a semi-structured interview format, where respondents are asked the same questions in a consistent manner. These may be either closed questions (with predetermined answers) or open-ended questions (allowing for more detailed responses) (Narzędzia badawcze, n.d.).

Focused, free-form interviews are broader in scope, enabling the interviewer to pose new questions as they arise during the conversation. Conversely, questions that seem irrelevant to the interview's flow can be omitted. The language used by the researcher and the phrasing of the questions should always be appropriately tailored to the context (Babbie, 2004).

In a structured interview (with pre-set questions), the initial questions are typically designed to establish rapport before moving on to the core topics (such as education or work experience, in the case of a job interview). After the main discussion, any doubts the candidate might have are clarified, and their questions or comments are addressed. The interview concludes by explaining what will happen next (e.g., "we will contact you").

The essence of a structured interview lies in the fact that the interviewer knows exactly what topics to cover, what information to seek, and which specific questions to ask. This approach follows a set structure, hence the name.

One advantage of structured interviews is that they ensure the interviewer gathers the information they specifically aim to obtain. Additionally, since the structure is consistent, another person conducting the interview would likely receive similar responses, providing more objective data (i.e., not influenced by the interviewer's personal style). However, a drawback of this method is that important information could be missed, as the interview does not allow for deviations from the predetermined questions.

Structured interviews are commonly used in situations where the focus is not on understanding the individuality of the respondent, but rather on obtaining objective facts, such as in admissions or interrogation settings. However, this type of interview is not suitable for contexts such as psychotherapy.

Below are some types of interviews, categorised in different ways (Wikipedia contributors. Wywiad ustrukturyzowany, n.d.):

- By level of freedom in answering:
  - In-depth interviews: Respondents speak freely on a topic, sharing their thoughts, memories, and associations, while the researcher mainly listens, records, and takes notes.
  - Focused interviews: Responses are somewhat more restricted, as the researcher directs the respondent towards specific topics through their questions.
- By level of freedom in questioning:
  - Structured interviews: In these, the researcher uses a standardised questionnaire with pre-set response options and detailed instructions on how to conduct the interview.
  - Semi-structured interviews: A flexible approach, combining both pre-prepared questions and spontaneous follow-up questions.
  - Unstructured interviews: These take the form of an informal conversation, aimed at gaining deeper insight into the respondent's motivations.
- By interview location:
  - In-store interviews, street interviews, in-home interviews, etc.
- By the respondent's awareness of the study's purpose:
  - Public interviews, covert interviews, and informal overt interviews.
- By the mode of contact with the respondent:
  - Face-to-face interviews.
  - Telephone interviews.
- By the number of participants in a face-to-face interview:
  - Individual interviews.
  - Group interviews (focus groups).

### 3.4. Group interview

In research methodology, various terms are used to highlight different aspects of the method. The term "focused group interview" (Wikipedia contributors. Zogniskowany wywiad grupowy, n.d.), which originated in America in the 1940s, focuses on the role of the moderator, who directs the conversation by asking questions to multiple participants at once. The phrase 'focus group' suggests that the participants are concentrated on a particular subject. In contrast, the term 'group discussion', more common in Europe, emphasises the active involvement of the participants, their interaction, and the exchange of views.

One of the key benefits of discussion groups, discovered in the 1970s, is their dynamic nature and the interaction that occurs among participants. Group settings often stimulate creativity, encourage the expression of emotions, and allow for the exploration of thoughts that go beyond rational discourse, tapping into areas that may be unconscious or difficult to articulate. Projection techniques are commonly employed in this type of research to explore content that is hard to verbalise.

Regardless of the terminology used, the essence remains the same: it refers to a research activity in which a moderator facilitates a discussion among pre-selected participants, chosen according to specific criteria based on the study's objectives. Typically, these groups consist of 6-8 people, though prior to the late 1980s, larger groups of 8 to 12 were common. A series of interviews, usually numbering 3-6, is conducted with different groups of respondents, with each session lasting around two hours. This approach mirrors natural meetings and discussions in everyday settings (Obserwator, n.d.).

In a focus group interview (Obserwator, n.d.), the moderator guides the conversation, prompting interaction and steering the discussion. Recruitment for such studies often occurs in public spaces. It's important to note that the findings from a focus group cannot be generalised to the entire population.

The discussion is structured according to a pre-prepared script that outlines the objectives for each stage of the study (i.e., what information needs to be gathered during each phase). The script may, but does not always, include the exact wording of the questions to be posed to participants. The discussion is typically recorded, either through audio or video, and may also be observed in real-time by others in a separate room through a one-way mirror, video feed, or via the Internet (Dźwigoł, 2018).

When designing qualitative research, researchers must decide whether to use group discussions or traditional in-depth interviews (one-to-one conversations). Group discussions offer the advantage of collecting data relatively quickly, as well as the ability to observe participant dynamics and interactions. On the other hand, individual interviews offer a more intimate setting, can be scheduled at a time and place convenient for the respondent, and allow for more in-depth responses. One-to-one interviews are particularly useful for discussing sensitive topics (although sensitivity may vary depending on the context), or when researching individuals with busy schedules, such as business professionals or politicians. They are also ideal for studies involving experts with complex knowledge on specialised subjects (e.g., teachers, journalists, analysts).

As with other qualitative methods, focus group interviews are not designed to produce representative samples. They have several uses (Dźwigoł, 2018):

- Firstly, they serve as a supplementary tool to gather initial data that helps define research problems and develop instruments for quantitative studies conducted on representative samples of a population. These instruments may take the form of questionnaires or interview scripts for surveys.

- Secondly, focus groups can be employed after quantitative research to deepen the interpretation of the results.
- Thirdly, focus groups hold value in their own right, particularly in research where statistical representativeness is not required. They are useful in reconstructing socially established meanings and patterns of perception, judgement, and behaviour, such as in brand image studies, social customs, or stereotypes. They are also an effective method for assessing consumer reactions to new ideas, products, or trends, and for understanding the everyday language of the target demographic.

Different types of focus group discussions exist (Dźwigoł, 2018):

- Prolonged or extended groups: These sessions last longer than two hours, sometimes even for an entire day.
- Mini-groups (Mini FGI): These consist of 4-6 participants, providing each person more time to contribute to the discussion.
- Expert (Delphi) groups: These are held with specialists or experts in a particular field.
- Clash groups: Here, the group is divided into opposing sides, with conflicting views being debated (e.g., "pro-life vs. pro-choice" or "smokers vs. non-smokers"). Sometimes, two moderators are required to manage the group.
- Creative groups: These participants are tasked with generating creative ideas or solutions. Projection techniques and brainstorming methods are often used in these groups.

The focus group interview process consists of several stages:

1. Defining the purpose of the interview.
2. Organising the logistics: selecting a date, preparing the venue, recruiting participants, and choosing a moderator.
3. Developing the discussion guide (instructions).
4. Conducting the discussion.
5. Analysing the interview data and compiling a report.

During group interviews, several effects may occur:

- The synergy effect.
- The snowball effect.
- The stimulation effect.
- The safety effect.
- The spontaneity effect.

Depending on the purpose of the group interview, a variety of techniques and methods can be employed (Dźwigoł, 2018):

- To explore consumer emotions, opinions, and motivations:
  - Sorting.
  - Role-playing.
  - Projection.

- Confrontation.
- Deprivation questions.
- For the development of new products:
  - Combining features.
  - Forced associations.
  - Morphological analysis (Zwicky method).
  - Brainstorming (Osborn technique).
  - Synectics (Gordon technique).

Group phenomena, such as groupthink or shifts in risk perception, can emerge during these interviews.

### **3.5. Situational interview (diagnosing behaviour in a specific situation) (Rymszewicz, 2022)**

A situational interview closely resembles a behavioural interview, with the main distinction being that a situational interview evaluates a candidate's competence based on their previous work experiences. For this type of interview, specific 'case studies' are developed, representing real-life scenarios that may occur in the workplace. The candidate is asked to explain how they would handle a particular situation or what actions they would take in a given scenario.

In a situational interview, the questions focus on how the individual might respond to potential situations they could encounter on the job. This approach is often used to assess the candidate's knowledge and skills in a theoretical context, though it may not indicate whether they apply these competencies effectively in practice (Agencja Zatrudnienia Fundacji Fuga Mundi, n.d.).

## **4. Conclusion and Discussion**

Qualitative research provides valuable insights into the underlying causes and mechanisms behind the emergence of various phenomena. Its primary aim is to understand and explain the motives, emotions, and often hidden beliefs that drive human behaviour and actions. Unlike quantitative approaches that focus on numerical data, qualitative methods delve into associations, offering a richer and more nuanced understanding of thought processes, judgements, and social consciousness. This approach allows researchers to reconstruct simplified, value-laden images of reality, as well as uncovering habits and motivations that may not be consciously acknowledged by individuals (Dźwigoł, 2018).

Moreover, qualitative methods excel in identifying the components of phenomena, understanding their interconnections, and revealing the structure and roles within these phenomena. They allow for an in-depth exploration of events, processes, and social dynamics



that are often too complex to capture through quantitative means. As noted by Dźwigoł (2020a), combining different research methods, such as triangulation, strengthens the credibility of research findings, as it enables a multi-faceted analysis of the subject under investigation.

An essential discussion point lies in the flexibility and depth that qualitative research offers, which is particularly beneficial in understanding human behaviours in specific contexts. For example, qualitative methods can explore consumer reactions to new products, social stereotypes, and corporate images, offering insights into societal values and beliefs (Dźwigoł, Trzeciak, 2023). However, while qualitative methods provide depth, their limitation is the lack of generalisability. Unlike quantitative studies, which can offer broad statistical conclusions, qualitative research findings are often specific to the context or population being studied.

Another critical discussion point is the role of qualitative research in supplementing quantitative studies. Often, qualitative methods are used to enhance the interpretation of quantitative results, adding context and understanding to the numerical data. As shown by Dźwigoł et al. (2021), qualitative methods help explain complex processes such as the implementation of green logistics or the dynamics within energy security strategies. However, the challenge remains in balancing both approaches, ensuring that the depth of qualitative insights does not overshadow the need for generalisable findings in broader research contexts (Kharazishvili et al., 2020).

Building on the findings of this study, future research should aim to explore the integration of qualitative and quantitative methods more comprehensively, particularly in areas such as environmental sustainability, digital transformation, and strategic management. For example, studies on the role of renewable energy, environmental regulations, and knowledge spillover have shown that combining methods provides a clearer understanding of complex issues (Dźwigoł et al., 2023a). Expanding research in this area could contribute to developing more robust models for green economic growth and digital transformation.

Furthermore, as digital technologies continue to evolve, qualitative research can offer unique insights into how these technologies affect human behaviour and societal structures. Future studies should investigate how digitalisation impacts sustainability, urbanisation, and innovation, with a particular focus on the emerging trends in green finance and smart grids (Kwilinski et al., 2023c). This research could help policymakers and businesses adapt to the challenges posed by technological advancements while promoting sustainable development goals.

In conclusion, qualitative research remains a crucial tool for understanding complex social phenomena, but its future lies in further integrating it with quantitative approaches. By combining these methods, researchers can produce more comprehensive and applicable results, contributing to the advancement of knowledge in both academic and practical fields.

## References

1. Agencja Zatrudnienia Fundacji Fuga Mundi (n.d.). Retrieved from: <http://www.praca ffm.pl/index.php?mod=1&p=2&srw=1&text=/2008/03/270308mk>
2. Altkorn, J. (Ed.) (1998). *Podstawy marketingu*. O. Franciscans.
3. Babbie, E. (2004). *Badania społeczne w praktyce*. PWN.
4. Babbie, E. (2007). *Social research in practice*. PWN.
5. Cicourel, A. (1964). *Method and Measurement in Sociology*. Free Press.
6. Collis, J., Hussey, R. (2003). *Business research: A practical guide for undergraduate and postgraduate students*. Palgrave Macmillan.
7. Denzin, N. (1970). *The Research Act in Sociology*. Butterworth.
8. Dźwigół, H. (2020, March). Innovation in marketing research: Quantitative and qualitative analysis. *Marketing and Management of Innovations, 1*, 128-135. <http://doi.org/10.21272/mmi.2020.1-10>
9. Dźwigół, H. (2020a). Methodological and empirical platform of triangulation in strategic management. *Academy of Strategic Management Journal, 19*(4), 1-8.
10. Dźwigół, H. (2018). *Współczesne procesy badawcze w naukach o zarządzaniu. Uwarunkowania metodyczne i metodologiczne*. PWN.
11. Dźwigół, H. (2018). *Współczesne procesy badawcze w naukach o zarządzaniu. Uwarunkowania metodyczne i metodologiczne*. Warsaw: PWN.
12. Dźwigół, H., Trzeciak, M. (2023). Pragmatic methodology in management science. *Forum Scientiae Oeconomia, 11*(1), 67-90.
13. Dźwigół, H., Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023a). The role of environmental regulations, renewable energy, and energy efficiency in finding the path to green economic growth. *Energies, 16*(7), 3090. <https://doi.org/10.3390/en16073090>
14. Dźwigół, H., Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023b). Renewable energy, knowledge spillover, and innovation: Capacity of environmental regulation. *Energies, 16*(3), 1117. <https://doi.org/10.3390/en16031117>
15. Dźwigół, H., Trushkina, N., Kwilinski, A. (2021). The organizational and economic mechanism of implementing the concept of green logistics. *Virtual Economics, 4*(2), 41-75. [https://doi.org/10.34021/ve.2021.04.02\(2\)](https://doi.org/10.34021/ve.2021.04.02(2))
16. Frankfort-Nachmias, C., Nachmias, D. (2001). *Metody badawcze w naukach społecznych*. PWN.
17. Hammersley, M., Atkinson, P. (2000). *Metody badań terenowych*. Zysk i S-ka.
18. Kamiński, A. (1974). *Metoda, technika, procedura badawcza w naukach społecznych*. Ossolineum.

19. Kharazishvili, Y., Kwilinski, A. (2022). Methodology for determining the limit values of national security indicators using artificial intelligence methods. *Virtual Economics*, 5(4), 7-26. [https://doi.org/10.34021/ve.2022.05.04\(1\)](https://doi.org/10.34021/ve.2022.05.04(1))
20. Kharazishvili, Y., Kwilinski, A., Grishnova, O., Dźwigoł, H. (2020). Social safety of society for developing countries to meet sustainable development standards: Indicators, level, strategic benchmarks (with calculations based on the case study). *Sustainability*, 12(21), 8953. <https://doi.org/10.3390/su12218953>
21. Kharazishvili, Y., Kwilinski, A., Sukhodolia, O., Dźwigoł, H., Bobro, D., Kotowicz, J. (2021). Systemic approach for estimating and strategizing energy security: The case of Ukraine. *Energies*, 14(8), 2126. <https://doi.org/10.3390/en14082126>
22. Kirk, J., Miller, M. (1986). *Reliability and validity in qualitative research*. SAGE Publications.
23. Konecki, K. (2000). *Studia z metodologii badań jakościowych. Teoria ugruntowana*. PWN.
24. Kostera, M. (2003). *Antropologia organizacji: Metodologia badań terenowych*. PWN.
25. Kwilinski, A. (2019a). Mechanism for assessing the competitiveness of an industrial enterprise in the information economy. *Research Papers in Economics and Finance*, 3(1), 7-16.
26. Kwilinski, A. (2019b). Implementation of blockchain technology in accounting sphere. *Academy of Accounting and Financial Studies Journal*, 23(SI2), 1-6.
27. Kwilinski, A., Kardas, M. (2023). Enhancing process stability and quality management: A comprehensive analysis of process capability indices. *Virtual Economics*, 6(4), 73-92. [https://doi.org/10.34021/ve.2023.06.04\(5\)](https://doi.org/10.34021/ve.2023.06.04(5))
28. Kwilinski, A., Dalevska, N., Dementyev, V. V. (2022a). Metatheoretical issues of the evolution of the international political economy. *Journal of Risk and Financial Management*, 15(3), 124. <https://doi.org/10.3390/jrfm15030124>
29. Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023a). Unlocking sustainable value through digital transformation: An examination of ESG performance. *Information*, 14(8), 444. <https://doi.org/10.3390/info14080444>
30. Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023b). Environmental sustainability within attaining sustainable development goals: The role of digitalization and the transport sector. *Sustainability*, 15(14), 11282. <https://doi.org/10.3390/su1514112>
31. Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023c). The effects of urbanisation on green growth within sustainable development goals. *Land*, 12(2), 511. <https://doi.org/10.3390/land12020511>
32. Kwilinski, A., Lyulyov, O., Pimonenko, T. (2023d). Spillover effects of green finance on attaining sustainable development: Spatial Durbin model. *Computation*, 11(10), 199. <https://doi.org/10.3390/computation11100199>

33. Kwilinski, A., Lyulyov, O., Dźwigoł, H., Vakulenko, I., Pimonenko, T. (2022b). Integrative smart grids' assessment system. *Energies*, 15(2), 545. <https://doi.org/10.3390/en15020545>
34. Kwiliński, A., Merritt, P., Wróblewski, Ł. (2024). Advancing sustainable development goals through digital culture: A global research overview. *Cultural Management: Science and Education*, 8(1), 61-80. <https://doi.org/10.30819/cmse.8-1.04>
35. Moorhouse, J. (2000). *Podstawy marketingu*. Pret S.A.
36. Narzędzia badawcze (n.d.). Retrieved from: <http://www.wz.uw.edu.pl/pracownicyFiles/id17618-potkanie%203%20Narz%C4%99dzia%20badawcze.docx>
37. Obserwator (n.d.). *Wywiad grupowy zogniskowany*. Retrieved from: <http://www.obserwator.com.pl/badania/wywiad-grupowy-zogniskowany>
38. Pilch, T. (1977). *Zasady badań pedagogicznych*. Żak.
39. Rymaszewicz, V. (2022). Retrieved from: <https://rymszewicz.eu/post20130520/>
40. Silverman, D. (2008). *Interpretacja danych jakościowych*. PWN.
41. Skorny, Z. (1974). *Metody badań i diagnostyka psychologiczna*. Ossolineum.
42. Sztumski, J. (2005). *Wstęp do metod i technik badań społecznych*. Śląsk.
43. Wikipedia contributors. Obserwacja (nauki społeczne) (n.d.). Retrieved from: [https://pl.wikipedia.org/wiki/Obserwacja\\_\(nauki\\_spo%C5%82eczne](https://pl.wikipedia.org/wiki/Obserwacja_(nauki_spo%C5%82eczne)
44. Wikipedia contributors. Wywiad ustrukturyzowany (n.d.). Retrieved from: [https://pl.wikipedia.org/wiki/Wywiad\\_ustrukturyzowany](https://pl.wikipedia.org/wiki/Wywiad_ustrukturyzowany)
45. Wikipedia contributors. Zogniskowany wywiad grupowy (n.d.). Retrieved from: [https://pl.wikipedia.org/wiki/Zogniskowany\\_wywiad\\_grupowy](https://pl.wikipedia.org/wiki/Zogniskowany_wywiad_grupowy)

## THE PROBLEM OF THE GENDER PAY GAP IN POLAND IN THE FACE OF THE CHALLENGES OF TODAY'S LABOUR MARKET

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**Purpose:** Analysis and assessment of the situation of women on the Polish labour market with particular reference to the gender pay gap in the face of the challenges of the contemporary labour market.

**Design/methodology/approach:** This study is an overview and attempts to analyse the gender pay gap in Poland, based on recent Polish and foreign reports.

**Findings:** The results of the research contained in the reports analysed indicate that inequality in the position of women and men on the labour market is perpetuated and that the distance separating Poland in this respect from the countries of the European Union is not being reduced. Actions taken on this issue at state level are insufficient, failing to move away from a patriarchal model of economic development to an equality model. In response to growing concerns about the gender pay gap, the Council of Europe has taken steps to create a common position on the issue.

**Research limitations/implications:** The paper points to the problem of the gender pay gap, which has serious consequences in today's labour market. The study points out the common misinterpretation of the GDP indicator (gender pay gap), which, unlike the adjusted pay gap, significantly understates the actual statistics.

**Practical implications:** The author points to the pro-equality measures contained in the Directive of the European Parliament and of the Council of the European Union on strengthening the application of the principle of equal pay for men and women for equal work or work of equal value through pay transparency and enforcement mechanisms.

**Originality/value:** The expected economic downturn and changes in the labour market, driven by digitalisation, flexible forms of employment and remote working, bring new challenges for pro-equality labour market policies. Harnessing the potential of women brings tangible results for economies and businesses, hence measures should be taken to eliminate gender disparities in various areas of the wider labour market, including closing the wage gap.

**Keywords:** pay gap, labour market, woman in business.

**Category of the paper:** The paper is an overview.

## Introduction

Women in Poland, as in other countries, earn less than men, even if they do the same job. This is incompatible with the Constitution of the Republic of Poland (Article 33), the Labour Code (Chapter IIa, Article 18) and the provisions of international law that Poland has adopted as part of its membership of the UN (including the CEDAW Convention and ILO Conventions) and the European Union.

The lack of pay transparency and the difficulty in assessing the pay gap means that there is little knowledge of the subject in Polish society (Report of the Women's..., 2023, p. 20).

On average, women's lower wages have many causes. Women are more involved than men in running the home, caring for children and sick or incapacitated family members. The above means that they have less time and strength for professional development - not only are they overlooked for promotions, but they reach for them less often. A break from work due to maternity usually falls during the period of life when employees are climbing the career ladder the fastest. Women are more likely than men to work in lower-paid industries, are slower to be promoted, less likely to reach top positions, do not take as much overtime and are more likely to work part-time.

The World Economic Forum report examines the situation of women worldwide in terms of career opportunities, education, healthcare and political power. 132 years - that's how long it will take at the current rate of progress to close the global pay gap, according to the World Economic Forum's 2022 report (Figure 1).



**Figure 1.** Gender pay equality in perspective.

Source: Own work based on Report Global...

During the pandemic, women's unpaid care work increased, exacerbating the asymmetry in the combination of work-home responsibilities. Their incomes have also fallen as a result of the large price increase in 2022. Women felt it more than men due to lower wages and pensions. There is a low level of female labour force participation and a higher level of female inactivity (especially 50+) (Report of the Women's..., 2023, p. 4).

At the same time, it is becoming apparent how important women's work is to the economy. Countries with efficient health, education and welfare systems, where the majority of the workforce is female, have amortised the costs of the pandemic more quickly and started the economy earlier. Equality is becoming a key element of development, based on an economy of care and respect for the environment (Report of the Women's..., 2023, p. 4).

The aim of this paper is to analyse and assess the occupational situation of Polish women with a particular focus on the pay gap in the contemporary labour market.

## 1. Pay gap – definition and causes of occurrence

In Directive (EU) 2023/970 of the European Parliament and of the Council of 10 May 2023, the gender pay gap means the difference in average wage levels between female and male workers employed by an employer, expressed as a percentage of the average wage level of male workers (Article 3...). This means that the gender pay gap is the difference between the average gross hourly rates that women and men receive and is calculated on the basis of wages paid directly to employees before deducting income tax and social security contributions (The gender pay gap...).

The pay gap is measured by the GDP (gender pay gap) index, which is calculated using the formula shown in Figure 2. The value of the GPG index shows the percentage by which women earn less compared to men (or more if the index value becomes negative).

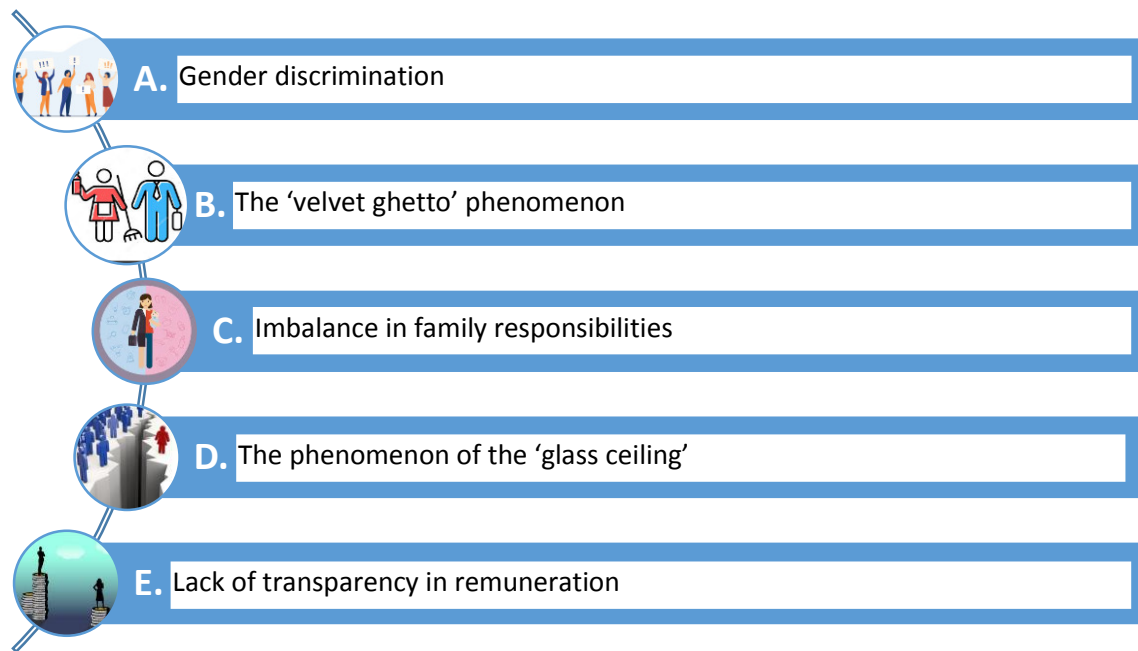
|                                     |   |
|-------------------------------------|---|
| $x = \frac{m - k}{m} \times 100 \%$ | <p>x - value of the pay gap<br/> m - gross pay rate for men<br/> k - gross pay rate for women</p> |
|-------------------------------------|---|

**Figure 2.** GDP index (gender pay gap).

Source: <https://wynagrodzenia.pl/luka-placowa>, 19.07.2024.

Adjusted gender pay gap takes into account, for example, age, experience, education or position held as important characteristics that affect pay. It is only when comparing the salaries of women and men in similar positions, with similar education and experience, that a true picture of gender equality in the context of pay is created. In a given country, a given organisation or a given sector. There is little to be gained from comparing absolutely all professions (and wages) that women and men do, e.g. nurses, teachers, drivers or finance directors, as there is when calculating the unadjusted pay gap (Pay gap...).

The gender pay gap is one manifestation of discrimination and can have many sources (Figure 3).



**Figure 3.** Main causes of the pay gap.

Source: Own work.

### **Gender discrimination**

Women, compared to men, often face poorer employment conditions, less favourable contracts and limited access to promotion. It is often the case that a woman with similar qualifications and experience is paid less than a man doing the same job, which is explained, for example, by women's lower availability or breaks for pregnancy and maternity leave.

### **Gender stereotypes and the division of social roles (velvet ghetto)**

One of the main causes of the wage gap is the so-called maternity penalty. Often after the birth of the first child, women's average earnings fall sharply, while men's earnings and promotions are not affected.

Furthermore, some professions are considered typically male, such as engineering or technology, while others, such as nursing or childcare, are considered typically female. This results in women often choosing lower-paid professions, while men have greater access to better-paid positions.

The overrepresentation of women in relatively low-pay sectors, such as care, healthcare or education, is responsible for around 24% of the total gender pay gap (The gender pay gap...).

Calculations show that women, on average, do more unpaid work (such as childcare or domestic duties). This leaves less time for paid work: according to 2022 data, almost a third of women (28%) work part-time, compared to only 8% of men. When both unpaid and paid work are taken into account, women work longer per week than men (The gender pay gap...).



### **Imbalance in family responsibilities**

Typically, women take on the responsibilities of caring for the home and family. This leads to career breaks, reductions in working hours or the choice of less demanding but lower-paid jobs. These career breaks can affect women's continued earnings and career development.

In 2018, one-third of female employees in the EU had a break from work due to childcare, compared to 1.3% of men. Women make some career decisions under the influence of caring and family responsibilities (The gender pay gap...).

### **Under-representation of women in leadership positions - (glass ceiling)**

Women are still under-represented in top management positions in many sectors of the economy.

Less than 8% of the CEOs of Europe's leading companies are women ([https://www.bankier.pl/...](https://www.bankier.pl/)). In 2020, they accounted for a one-third (34%) of managers in the EU, despite making up almost half of the workforce. If we look at the difference across occupations, female managers earn 23% less per hour than male managers (The gender pay gap...).

Differences in the assessment of discrimination in the workplace reveal opinions on promotion opportunities, with 69% of women and 41% of men agreeing with the statement that it is easier for men to get promoted than women (Report of the Women's..., 2023, p. 13). This results in them having less influence on pay and promotion decisions.

### **Lack of transparency in remuneration**

Transparent and unambiguous remuneration systems in companies are often lacking. This can foster gender discrimination, as workers do not have access to information on the wages of other workers and are unable to compare their wages with those of people doing the same job.

The results of the qualitative research in the Women's Congress Association Report confirm that lower pay for female managers is mainly due to discrimination, but there are also times when women's expectations are underestimated (Report of the Women's..., 2023):

- Female and male HR professionals also believe that the pay gap in Poland is due to discretionary and unprocedural management and prejudice against women's work, perceived to work less well and be less secure in their employment.
- There is a greater risk of a pay gap in Polish, owner-operated, smaller and/or state-owned companies than in large, multinational corporations. This is also confirmed by scientific research (Magda, Sałach, 2019).
- Smaller companies, generally also Polish and owner-operated, do not have any payroll monitoring systems in place because they do not see the need - they manage it 'ad hoc'.

Large multinationals have imposed procedures to control wages, and they also carry out external audits.

- They expect larger gender pay gaps in conservative, hermetic, ‘crony’ industries where there is a lot of money and power: finance, banks, law firms.
- Some male and female HR professionals note that women are sometimes ‘financially penalised’ for having children, such as being deprived of bonuses for taking leave for a child.
- The pay inequalities relate to managerial, not executive, positions. In executive positions, women often work in lower-paying departments and/or industries.

## 2. Gender pay gap - Poland compared to the European Union

The average so-called gender pay gap, i.e. the difference between men's and women's hourly wages in the European Union in 2021, was 12.7% (The gender pay gap...). By contrast, according to the latest available Eurostat data, Poland is at 4.5% in 2021. Thus, against the background of the European Union, Poland presented itself as a very egalitarian country. Only three countries could boast a better result: Slovenia, Romania and Luxembourg (Why do women...).

However, the above figures are misleading. They refer to the so-called raw pay gap, which does not take into account differences in the employment structure between men and women. Researchers of labour market inequalities prefer to use adjusted gap data, i.e. a gap that takes into account the pay-relevant characteristics of workers (e.g. age, occupation, experience, education, family situation) and the characteristics of the workplace (position, sector, form of employment, type and size of employer).

The pay gap between men and women calculated in this way is, according to various estimates, between 12 and even 20% in Poland (Why do women...). This means that Poland is in the group of countries with a pay gap above the EU-27 average (ranking 13th out of 27 countries) (Leythienne, Perez-Julian, 2021).

Sectors and professions in which women predominate include less well-paid ones such as education, social care and health care, but also ones such as cashiers, beauticians and hairdressers. As opposed to: finance or new technologies. The CSO's biennial report ‘Survey of the Structure of Wages in Poland’ allows for more detailed monitoring of this aspect of work in Poland. As the CSO states in the chapter ‘Gender pay gap index’ - ‘the gender pay gap index reports the gross hourly wage gap between men and women, but does not indicate the reasons for it’. However, a few conclusions, on closer examination of the CSO data, are puzzling to say the least: the wage gap is narrowing only in low-paid sectors - ‘the lower the average pay,

the more similar the average pays of men and women are to each other” (<https://stat.gov.pl/...>). The amount of the gender pay gap in some sectors, especially in finance and insurance, is very worrying: The GPG here is 27.6%, an industry that employs half as many women as men (it is worth noting that, in construction, for example, the ratio is negative - women earn more, but only account for about 15% of employees). Analysis of GPG by length of service shows that among those employed for more than 20 years, GPG is only 0.6%, although women's pay is lower in all groups of employees, with the highest value of 13.5% GPG in the group with length of service between 10 and 15 years, the age group of women who usually have childcare responsibilities. An analysis of the GPG rate by education shows differences to the disadvantage of women at every level. Although the best-educated women among the working population are the most numerous at 64.9%, the GPG is 22.2% in this group; at primary education level, this difference is 15% (Pay gap - does it...).

The lack of systematic data on the adjusted wage gap and other aspects of women's situation in the labour market, as well as in-depth analyses by gender, make it difficult to increase knowledge on equal opportunities in the labour market.

The results of a survey carried out in Poland, contained in the Women's Congress Association's Report ‘Women, the labour market and wage equality’, show that three quarters of respondents believe that the pay gap is not fair, but most have not encountered the term ‘pay gap’. While the problem of the pay gap is noticeable for women, 44% of men consider it too exaggerated. The significant difference between responses by gender confirms that men in particular do not perceive the problem of pay discrimination:

- 75% of people (83% of women and 67% of men) do not think that the gender pay gap is fair, while 15% (11% of women and as many as 19% of men) do.
- Less than 25% of Polish women and men have encountered the concept of a pay gap. Knowledge is equally low among both men and women.
- 51% of respondents (and 64% of women) do not agree with the statement that the problem has been artificially exaggerated, however, almost 1/3 of respondents agree with this statement, including 44% of men.
- Yet there is a perception, especially among women, that they earn less than men doing the same job. The majority of women surveyed (67%) agree with the statement that women in Poland earn less than men in the same positions and with the same responsibilities. In contrast, only 39% of male respondents hold this view.

The above indicates that there is a definite lack of awareness and knowledge of equal rights for women and men in Poland.

### **3. The pay gap – determinants and consequences for the modern labour market**

According to the CSO, in 2021, 26.9% of women will have a university degree, compared to only 19% (Wysocka, 2023, p. 13) of men, and yet there is a 4.5% pay gap for the same position (<https://www.gigroupholding.com/...>).

A correct diagnosis of the sources of the pay gap is important in order to look for solutions to it in the context of the challenges of today's labour market, which mainly concern the strong competition for workers related to their increasingly scarce availability. Women's potential is still not being adequately harnessed in many industries, and without their knowledge and skills it will be impossible to provide a skilled workforce.

At the same time, the widespread digital transformation and automation are creating opportunities for advancement, including by increasing or changing professional qualifications, also providing the opportunity to increase female employment. This trend is reinforced by the increasing focus of companies on integration and the growth of technical and engineering competence among women.

According to the study 'Manufacturing industry - Global HR trends 2023' Gi Group Holding, Polish entrepreneurs see great opportunities for company development in this area. More than half assure that they will increase the employment of women in their organisations over the next five years. The good news is that, compared to other European women, Polish women are more likely to choose STEM (science, technology, engineering, mathematics) fields of study, which means that in a few years' time there will be far more female engineers and programmers on the labour market than at present. The development of digital competences will become a guarantee of continued employment with satisfactory remuneration. Workers without the right skills will struggle to find work or be condemned to low-paid jobs (<https://www.gigroupholding.com/...>).

The persistent disparity in earnings between men and women is costly for the economy. 'The issue has to do with the resource efficiency of society. If women do not have the same opportunities to participate in the labour market or participate unequally, labour and knowledge resources are wasted' (Why do women... (– as written by the Nobel Committee in 2023 in its justification for the award to C. Goldin - an economist who has researched key factors affecting the gender gap in the labour market.

The gender pay gap increases with age - with career progression and increasing family demands - while it is rather low when women enter the labour market. With less money to save and invest, gaps accumulate, making women more vulnerable to poverty and social exclusion in old age. In 2020, the gender pension gap in the EU was around 28%. Reducing the gender pay gap results in greater gender equality, while reducing poverty and stimulating the economy, as the higher the pays, the greater the purchasing power of women, the more to tax and the lower the burden on welfare systems. Research shows that reducing the gender pay gap by 1 percentage point would increase gross domestic product by 0.1%.

## 4. Conclusion

This study gives many examples of research results indicating that inequality in the position of women and men on the labour market is perpetuated and that the gap between Poland and the countries of the European Union in this respect is not narrowing. Government action is often a sham - there is still a lack of concrete action, political will and a move away from the patriarchal model of economic development towards an equality model.

In response to growing concerns about the gender pay gap, the Council of Europe has taken steps to create a common position on the issue. In 2022, it agreed on joint actions, through which it highlighted the need to monitor, identify and eliminate pay gaps and committed Member States to take concrete action to ensure pay equality.

The new provisions include, among other things, the right of employees to information on their individual level of remuneration and the average level of remuneration, broken down by gender, for categories of employees performing the same work or work of equal value. Employers with 100 or more employees will have to publish information on the gender pay gap. Under the new directive, those who are victims of gender-based pay discrimination will be able to receive compensation, including full recovery of back wages and related bonuses or payments in kind.

Access to justice for victims of pay discrimination is also to be improved. EU countries will have three years to implement the changes in their countries.

Improving the situation of women in the labour market also depends on women themselves, who very often have lower financial expectations and underestimate their competences when applying for higher positions.

The expected economic downturn and changes in the labour market, driven by digitalisation, flexible forms of employment and remote working, bring new challenges for pro-equality labour market policies.

In addition, the skills gap that prompts companies to create flexible workplaces provides an opportunity for people representing social groups characterised by lower labour force participation, including women raising children. Education and the development of competences, both digital and soft, are key to improving the situation of women in the labour market. Due to the rapid development of digitalisation and automation, the demand for specialists in this area is increasing. Skills in technology, data analysis, project management or negotiation can help women to stay in the labour market and secure stable employment.

In addition, systemic childcare arrangements are needed to facilitate women's return to the labour market after maternity leave. Currently, it is not only the high cost of private facilities that is keeping women at home, but also, especially in smaller towns, the insufficient number of crèches and kindergartens or their complete absence.

Further research direction should also include identifying good practices of companies themselves in ensuring equal pay for women. The above activities should be developed taking into account standardization of positions, analysis of critical points and regular audits.

Harnessing the potential of women brings tangible results for economies and businesses, hence measures should be taken to eliminate gender disparities in various areas of the wider labour market, including closing the wage gap.

## References

1. Article 3 of Directive (EU) 2023/970 of the European Parliament and of the Council of 10 May 2023, <https://eur-lex.europa.eu/legal-content/PL/TXT/?uri=CELEX%3A32023L0970>, 19.07.2024.
2. [http://ibs.org.pl/app/uploads/2019/06/IBS\\_Working\\_Paper\\_05\\_2019.pdf](http://ibs.org.pl/app/uploads/2019/06/IBS_Working_Paper_05_2019.pdf)
3. <https://stat.gov.pl/obszary-tematyczne/rynek-pracy/pracujacy-zatrudnieni-wynagrodzenia-koszty-pracy/struktura-wynagrodzen-wedlug-zawodow-za-pazdziernik-2022-r-,5,8.html>, 12.10.2023.
4. <https://www.bankier.pl/wiadomosc/Luka-placowa-w-Polsce-na-tle-UE-Jest-dobrze-Ale-czy-na-pewno-8453068.html>, 11.12.2022.
5. <https://www.gigroupholding.com/polska/sytuacja-kobiet-na-polskim-ryнку-pracy-2/>, 12.08.2024; 31.07.2024.
6. <https://wynagrodzenia.pl/luka-placowa>, 19.07.2024.
7. Leythienne, D., Perez-Julian, M. (2021). *Gender pay gaps in the European Union – a statistical analysis*. Eurostat.
8. Magda, I., Sałach, K. (2019). Gender Pay Gap Patterns in Domestic and Foreign-Owned Firms. *IBS Working Paper*, 5.
9. *Pay gap - does it accurately show inequalities in the labour market, can it be eliminated quickly?* <https://esg.ing.pl/strefa-inspiracji/luka-placowa>, 22.05.2024.
10. *Report Global Gender Gap 2022*, <https://odpowiedzialnybiznes.pl/wp-content/uploads/2022/07/Global-Gender-Gap-Report-2022.pdf>, 29.07.2024.
11. *Report of the Women's Congress Association „Kobiety, rynek pracy i równość płac”* (2023). Warszawa. <https://kongreskobiet.pl/wp-content/uploads/2023/05/RAPORT.pdf>, pp. 4-20, 15.07-12.08.2024.
12. *The gender pay gap: definition and causes*. European Parliament, <https://www.europarl.europa.eu/topics/pl/article/20200109STO69925/luka-placowa-miedzy-kobietami-a-mezczyznami-definicja-i-przyczyny>, 5.04.2023.

13. *Why do women earn less than men and what to do about it?* <https://pro.rp.pl/panel-ekonomistow/art39659201-dlaczego-kobiety-zarabiaja-mniej-niz-mezczyzni-i-co-z-tym-zrobic>, 5.01.2024.
14. Wysocka, A. (2023). *Zmiany w strukturze poziomu wykształcenia ludności Polski w świetle wyników Narodowego Spisu Powszechnego Ludności i Mieszkań 2021*. Proceedings of the 3rd Demographic Congress. Part 12, Education system in the face of demographic change. Warszawa: Government Population Council. [https://kd.stat.gov.pl/images/publikacje/system-edukacji-wobec-zmian-demograficznych\\_14.06.pdf](https://kd.stat.gov.pl/images/publikacje/system-edukacji-wobec-zmian-demograficznych_14.06.pdf), p. 13, 12.08.2024.





## ISSUES OF ASSERTIVENESS AT WORK

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**Purpose:** The paper deals with the issues of assertiveness at work. Assertiveness can have a positive impact on work efficiency and employee motivation. First of all, if employees' needs are defined in a clear and specific way and their opinions are taken into account, it increases their self-confidence and belief in own abilities. This often arouses admiration and respect among co-workers. Responsible assertiveness also ensures positive interactions in the workplace. The purpose of this paper is to highlight this very important problem.

**Design/methodology/approach:** Literature research of the subject was carried out.

**Findings:** One of the priorities in shaping desired organizational behaviors is developing responsible assertiveness among employees. One can say that assertiveness is tantamount to balancing on a thin line that separates what is good and comfortable from what others expect. Being assertive means standing up for your values and clearly defined needs. However, while respecting others' attitudes. It's definitely not an easy skill to acquire, that's why many employees learn and improve it throughout their lives. That is why it is so important to raise this topic and provide professional support in this area.

**Practical implications:** The issues discussed in this paper significantly affect the improvement of methods related to workplace management, the desired shaping of employees' attitudes and behavior regarding the approach to the problem of assertiveness at work, a problem related to work environment that has been downplayed so far.

**Originality / value:** A holistic approach to the issues of assertiveness at work. Defining it as an interdisciplinary problem. Making it clear that the problem should be dealt with by specialists in various fields, theorists and practitioners. It requires the attention of specialist practitioners, including psychologists, psychotherapists and physiologists as well as specialists in occupational medicine.

**Keywords:** Management, assertiveness at work, human factor.

**Category of the paper:** review paper.

## 1. Introduction

Very frequently, one can hear the opinion that assertiveness is tantamount to refusing, the difficult art of saying “no”. However, this is quite an oversimplification. Refusing to help someone in a way that lacks respect and understanding for the other person is definitely closer to ignorance or arrogance and has little in common with the properly understood assertiveness. A person tending to behave like this is rather considered to be conceited and cheeky rather than assertive. And as we know, relationships based on mutual respect are particularly important in the workplace, where they provide the basis for professional success and a friendly organizational culture (Griffin, 2002; Zaborowski, 1985; De Drue, Gelfand, 2006; Killoren et al., 2015).

Herbert Ferenstein – a psychologist and co-author of assertiveness theory believed that: “If you are in doubt whether specific behavior is assertive, check if it increases your self-respect even a little bit”.

It should be noted that assertiveness, which is largely associated with refusing, is also the ability to express our needs. However, employees are often afraid to be assertive at work. You may ask why this is the case? This may be the case, because assertiveness is not taught at home very often, and disobedience is associated with lack of being liked. It is believed that refusal may result in unpleasant consequences, loss of being liked, and perhaps even lack of promotion or losing a job. However, it should be noted that assertiveness can have a positive impact on performance and motivation at work. First of all, if our needs are defined in a clear and specific way and our opinions are expressed in the same way, we increase our self-confidence and belief in our own abilities. This often arouses admiration and respect to us among co-workers. It also facilitates positive interactions. You may have the impression that when we express a different opinion, it will have unpleasant consequences. However, if our opinion is substantively justified and the statement is not aggressive, it will certainly be appreciated by a wise employee group.

But when are we actually assertive? Not only when we say “no”, but also when we say “yes”. It's about living in harmony with yourself, not being ashamed of what you need and want, but at the same time being aware and respecting that other people also have their needs.

Assertiveness at work is about showing that we set our boundaries without crossing other people's borders. This attitude creates the golden mean between being decisive and being submissive. Aggression, taking offense, excessively emotional reactions, automatically agreeing or denying the opinions of others are typical for unassertive people (Reiman et al. 2019; Søk, 1988; Mansfield, 1995).

## 2. Literature review

Assertiveness is a psychology term that means the ability to refuse and freely express one's opinion, criticism, emotions and needs. Assertive persons communicate with other people in a direct, open and honest way – so that when expressing opposition or their own opinion not only defend their rights, but also respect the rights of others.

In other words it is the ability to behave at the same time maintaining self-respect and showing respect for others. This is the ability to behave in a non-aggressive way, without causing suffering to others or yourself. One can say that an assertive person is guided by the following motto: “Your rights and needs are as important as mine. If there is a conflict between us, let's get to know each other's points of view and respect them as well as their possible differences. Let's work out the best solution for both of us and maybe we will learn something important in the process. It will be great, if we can find it. If not, that's too bad, at least we will know that we have tried our best and we will all act in harmony with each other” (Stoner, Wankel, 1997; Gros, 1994; Townsed, 1996; Witkowski, 1994).

It is important to know that assertiveness is an acquired skill – this means that no one is born naturally assertive, each of us develops this skill better or worse during our relationships and interactions with other people. People vary greatly in their ability to be assertive and often develop into being overly submissive or demanding of others. Definitely, people who can be assertive are more satisfied with themselves, their relationships with other people and generally enjoy better mental health. To a large extent, this is because they can take care of what is important to them without compromising the people around them. At the same time, they are often much more respected, appreciated and liked by others than non-assertive people.

An assertive person can talk to others and clearly state what his needs, possibilities, and limitations are. The difficult part is not agreeing to something that is uncomfortable for us, but in a polite and non-confrontational way. However, accepting praise and appreciating your own successes can also be a challenge – not everyone can do it! Finding the golden mean between protecting yourself and caring for the feelings of others is just what the assertiveness is all about. Therefore, assertive persons are not just the ones who keep saying “no”. At the right moment, they can say “yes” and accept a compliment, praise or celebrate their personal success. It is very important to be able to keep balance and harmony.

One can say that assertiveness is tantamount to balancing on a thin line that separates what is good and comfortable for us, from what others expect from us. Being assertive is nothing but standing up for your own values and needs, but at the same time respecting the attitudes of others. It's definitely not an easy skill to acquire, that's why many of us learn and improve it throughout their lives (Knight et al., 2010; Sęk, 1991).

Assertive persons:

- skillfully and clearly formulate their thoughts, opinions, wishes, requests,
- accept criticism without getting offended,
- listen to others and respond appropriately (do not offend or force people to change their minds),
- are resistant to pushing, external pressures, including the expectations of others,
- can admit a mistake and apologize,
- can ask for help when they need it,
- control their emotions – this does not mean that they are deprived of them,
- have high self-esteem, self-confidence and self-concept,
- protect their own good and care for the good of others,
- can say “no”,
- have the ability to be firm,
- have the ability to work out compromises,
- have the ability to represent their own interests while taking into account the interests of others,
- accept their own mistakes and recognize successes,
- have the ability to claim and enforce their rights, respecting other people's boundaries.

Not everyone is born with a strong assertive attitude, but, as previously mentioned, it can be learned and developed.

Developing an assertive attitude requires:

- clear and articulate expression of thoughts and feelings – opposition when something is uncomfortable and should not be done, even if there is pushing and pressure from some other person,
- opposing attitudes that are bad for the employee, harmful, uncomfortable, arousing fear or anger,
- preparing and presenting arguments in a substantive way – why a given person should change his or her behavior, what specific consequences he or she faces if he or she does not do so, this is absolutely not about intimidating others,
- appreciating oneself, improving self-esteem and self-confidence,
- enjoying even small achievements and successes,
- accepting own mistakes – only the ones who do not take such actions do not make them,
- asking for help if needed,
- accepting compliments and praise, not diminishing one's merits (Chrapieńska-Krupa, 2024; Telzer, Fuligni, 2009; Olszewski, 2000).

### 3. The process of developing assertiveness

Assertiveness can be actively developed in many ways, including with the help of a psychotherapist or psychologist. By participating in various types of courses or trainings to develop and at a later stage, to maintain the assertiveness. One can also use the professional literature in the form of various types of guides available in libraries or bookstores as a support.

The process of developing assertiveness should at first start with diagnosing the causes behind it. What is the problem with not being able to express our needs or opinions on a given topic? These may include our beliefs about ourselves, other people, and the assertive attitude itself. They are often created at an early age through experiences and messages from people in our immediate environment. If we used to hear that our needs and opinions were not important, or we were punished for expressing our emotions or for not agreeing to something, this could of course have an impact on our behavior in adult life. Of course, the reasons behind the problem of lack assertiveness in adults are much more complicated, may consist of many components and experiences that we have gone through at various stages of our development.

Below we present the most common myths about an assertive attitude that lead to not expressing one's own needs.

If you are assertive:

- other people will not like you,
- you will be perceived as conflictual,
- other people will not respect you,
- you will be perceived as selfish,
- you will be perceived as aggressive,
- with such an attitude you will not get promoted,
- you can lose your job.

### 4. Assertiveness in the workplace

Most employees wonder about the level of their assertiveness. Can you say no to your superior or colleague? In such situations, you should demonstrate intuition and objectively assess the situation – are there really no favorable conditions to perform this task? Will the refusal result in negative consequences for the person refusing or for the organization? If the answers to these questions are “no”, then no problem – refuse duly justifying your decision. However, if the answer is yes, then you should address the problem with understanding and perform the assigned task within the expected time. Unfortunately, even in

companies with the most favorable organizational culture, sometimes there is simply no room for being opposed.

There are many people who find that it is okay to say no in any situation. While others say that it is not allowed at all. In order not to go to extremes, it is worth analyzing the situation carefully and answering a few questions before making a decision:

- How long will it take to complete the assigned task?
- Are we really able to help?
- Will this affect other obligations?
- Why was such a request addressed to me?
- Are there people in the company who are more competent and knowledgeable in this field?
- Is the person asking for help actually unable to complete the task on their own?

If, after analyzing the situation, it turns out that more facts give reasons for refusal, it should be given in a skillful manner. Of course, it is natural to worry about how to do it so as not to offend anyone or to go down in colleagues' estimation. Please note that just because you are unable to provide the support you have been asked for in a given situation, it does not mean that you will not be able to do so in the future. When refusing, you should first ensure that the interlocutor feels your good intentions and understands that he or she can ask for help again next time. It's also good if you can try to help at least a little, for example, by suggesting some different solution. This is this way we show concern and interest – then the co-worker will certainly understand our arguments and, despite our lack of help in a given matter, will end the conversation with a positive attitude.

It is natural for employees that they want to be liked and accepted by their colleagues and to enjoy the trust of their superiors. Therefore, at work you should try to be as helpful and proactive as possible. However, it is good to keep in mind that people value features such as honesty and consistency, which is why being in harmony with yourself is very important in professional life (Heimpel et al., 2006; Gembalska-Kwiecień, 2017; Ferguson, 2006).

## 5. Conclusions

The presented analysis and conclusions of an issue important for quality management sciences, namely the effective and final communication connection, which affects the entire process of providing public services. By summarizing everything that has been presented above about assertiveness in psychology we can say that assertiveness means expressing your thoughts, feelings and views while maintaining your own boundaries and respecting the borders set by other people. In his book “Perfect Assertiveness” J. Ferguson presents the 10 rights of an assertive person. We present them below.

The list of 10 rights of an assertive person, according to which everyone has the right:

1. to ask what they want – which of course doesn't mean they have to get it,
2. express their opinion, feelings and emotions – assertively, i.e. adequately to the situation,
3. not to be discriminated against,
4. to make decisions independently and bear their consequences,
5. to decide whether they want to get involved in other people's problems – they do not have to constantly sacrifice themselves for others,
6. to be able to make mistakes and learn from them without feeling guilty,
7. get what they pay for – when they buy something or use services,
8. to change their decisions – as you develop and learn, you do not always have to have the same opinion,
9. their privacy,
10. to be successful – you should not minimize your achievements, you should enjoy them (Zimmerman et al., 2015; Siwek-Ślusarczyk, 2024; Lis, 2024; Martyński, 2023).

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## References

1. Adler, R.B., Proctor, R.F., Rosenfeld, L.B. (2016). *Relacje interpersonalne. Proces porozumiewania się*. Poznań: Rebis.
2. Chrapińska-Krupa, M. (2024). <https://spokojwglowie.pl/asertywnosc/>
3. De Drue, C.K.W., Gelfand, M.J. (2008). Conflict in the Workplace: Sources, Functions, and Dynamics Across Multiple Levels of Analysis. In: C.K.W. De Drue, M.J. Gelfand (eds.), *The Psychology of Conflict and Conflict Management in Organizations*. New York.
4. Ferguson, J. (2006). *Asertywność doskonała*. Rebis.
5. Gembalska-Kwiecień, A. (2017). *Czynnik ludzki w zarządzaniu bezpieczeństwem pracy w przedsiębiorstwie. Wybrane zagadnienia*. Gliwice: Wydawnictwo Politechniki Śląskiej.
6. Griffin, R.W. (2002). *Podstawy zarządzania organizacjami*. Warszawa: PWN.

7. Gros, U. (1994). *Organizacyjne aspekty zachowania się ludzi w procesach pracy*. Katowice: Wydawnictwo Akademii Ekonomicznej.
8. Heimpel, S., Elliot, A., Wood, J. (2006). Basic personality dispositions, self-esteem, and personal goals: An approach-avoidance analysis. *Journal of Personality*, 74, 1293-1319.
9. Killoren, S.E., Wheeler, L.A., Updegraff, K.A., Rodríguez de Jesús, S.A., McHale, S.M. (2015). Longitudinal Associations among Parental Acceptance, Familism Values, and Sibling Intimacy in Mexican-Origin Families. *Family Process*, 54(2), 217-231.
10. Knight, G.P., Gonzales, N.A., Saenz, D.S., Bonds, D.D., German, M., Deardorff, J. et al. (2010). The Mexican American Cultural Values Scales for adolescents. *Journal of Early Adolescence*, 30(3), 444-481.
11. Lis, K. (2024). <https://www.hays.pl/blog/insights/asertywnosc-w-miejscu-pracy>
12. Mansfield, P. (1995). *Jak być asertywnym*. Poznań: Zysk i S-ka.
13. Martyński, M. (2023). *Asertywność: co to znaczy? Cechy osoby asertywnej*. <https://interviewme.pl/blog/asertywnosc>.
14. Olszewski, J. (2000). Rozwijanie umiejętności asertywnych u kadry kierowniczej metodą treningu behawioralno-kognitywnego. *Annales Universitatis Mariae Curie-Skłodowska vol. XIII*. Lublin: Wydawnictwo Naukowe Uniwersytetu Marii Curie-Skłodowskiej.
15. Reiman, A., Pedersen, L.M., Väyrynen, S., Sormunen, E., Airaksinen, O., Haapasalo, H.A. (2019). Safety Training Parks – Cooperative Contribution to Safety and Health Trainings. *International Journal of Construction Education and Research*, 1, 19-41.
16. Sęk, H. (ed.) (1991). *Spoleczna psychologia kliniczna*. Warszawa: PWN.
17. Sęk, H. (1988). Rola asertywności w kształtowaniu zdrowia psychicznego. Ustalenia terminologiczne i metodologiczne. *Przegląd Psychologiczny*, no. 3.
18. Siwek-Słószarczyk, M. (2024). <https://www.centrumdobrejterapii.pl/materialy/asertywnosc-co-to-jest/>
19. Stoner, J.A.F., Wankel, Ch. (1997). *Kierowanie*. Warszawa: PWE.
20. Telzer, E.H., Fuligni, A.J. (2009). Daily family assistance and the psychological well-being of adolescents from Latin American, Asian, and European backgrounds. *Developmental Psychology*, 45, 1177-1189.
21. Townend, A. (1996). *Jak doskonalic asertywność. Praktyczny podręcznik asertywności dla menedżerów*. Poznań: Zysk i S-ka.
22. Witkowski, S. (1994). Trening kierowniczy - uczenie się przez doświadczanie. In: S. Witkowski (ed.), *Psychologia sukcesu*. Warszawa: PWN.
23. Zaborowski, Z. (1985). *Trening interpersonalny*. Wrocław: Ossolineum.
24. Zimmerman, J., Morrison, A., Heimberg, R. (2015). Social anxiety, submissiveness, and shame in men and women: A moderated mediation analysis. *British Journal of Clinical Psychology*, 54(1), 1-15.



## ISSUES OF OCCUPATIONAL FATIGUE

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**Purpose:** The paper deals with the issues of occupational fatigue. One of the features of the work model adopted in recent years is that employees work more than forty hours a week. This results in greater fatigue, which over time may turn into severe fatigue. Then we cannot cope with our work tasks and we are also mentally less resistant to various types of stressful situations, which deepens the feeling of fatigue and exhaustion. Chronically tired people usually suffer from insomnia, which deepens problems with the already disturbed circadian rhythm and does not allow us to have a sufficient rest. Strong and constant fatigue, described as exhaustion, is a signal that your body needs some rest. Chronic fatigue may also indicate the presence of a disease. The purpose of this paper is to highlight this very important problem.

**Design/methodology/approach:** Literature research of the subject was carried out.

**Findings:** They fatigue also increase the risk of accidents, defects or mistakes at work. Fatigue itself is not a disease, but only a symptom. According to general practitioners, chronic fatigue, which persists for no apparent reason, is currently one of the most common health problems reported by their patients. Unfortunately, diagnosing and treating this condition is not easy due to the large number of possible causes and risk factors.

**Practical implications:** The issues discussed in this paper significantly affect the improvement of methods related to work environment management and the desired shaping of employees' attitudes and behavior regarding the approach to the problem of being tired at work, a problem related to work environment that has been downplayed so far.

**Originality/value:** A holistic approach to the issues of occupational fatigue. Defining it as an interdisciplinary problem. It should be dealt with by doctors of various specialties, especially in occupational medicine, of course, but also general practitioners, neurologists, gastroenterologists, and cardiologists. It also requires the attention of non-medical specialists, including psychologists and physiologists.

**Keywords:** company management, occupational fatigue, human factor.

**Category of the paper:** review paper.

## 1. Introduction

One of the typical features of the work model adopted in recent years is taking on more and more responsibilities that require working far more than forty hours a week. In addition, the era of remote working is here with us – which, apart from bringing undoubtedly positive impacts, has also some negative features. For example, we can work “as much as we wish” and “with no time limits”, because for many employees the professional sphere has entered the private one and they cannot separate them. Unfortunately, as a result, we feel more and more tired, which over time may turn into severe fatigue – and at the same time we do not have time to regenerate.

When we are overworked, we cannot cope with everyday responsibilities and challenges. We are also mentally far less resistant to various types of stressful situations, which in turn further deepens the feeling of fatigue and exhaustion. We also often have chronic headaches, sometimes irritating migraines, tension and pain in muscles, including neck and even spine pains. A very common and troublesome symptom of fatigue comprises problems with the digestive system, which manifests itself in the form of chronic stomachache and diarrhea. Chronically tired people usually suffer from insomnia, which deepens problems with the already disturbed circadian rhythm and does not allow us to have a sufficient rest. For this reason, we are sleepy, apathetic and unable to work during the day. Chronic fatigue quite often causes skin problems, hair loss and even weight gain. For many women, the state of being overworked may result in irregular periods and problems with getting pregnant.

Strong and constant fatigue, described as exhaustion, is a signal that your body needs some rest. Chronic fatigue may also indicate the presence of a disease (Stoner, Wankel, 1997; Gembalska-Kwiecień, 2017; Reiman et al., 2019).

## 2. Literature review

It's definitely not an easy skill to acquire, that's why many of us learn and improve it throughout their lives (Knight et al., 2010; Sęk, 1991). Of course, there are many definitions of fatigue in the reference publications, so below I will present those that explain the problem concisely and factually:

- Fatigue can be defined as a disturbance in the balance of basic life processes, leading to reduced capacity to work.
- Fatigue is a specific work-related “physiological cost”. This cost should be as low as possible, which is achieved, among others, by introducing proper work organization, including the system of breaks and rest periods.

- Fatigue – forcing us to stop performing activities – is a defensive and protective body reaction protecting it against the effects of excessive strain on the muscles or nervous system. Therefore, this is one of the autoregulatory signals that act similarly to the feeling of hunger or thirst.
- Fatigue is a reversible reduction in the body's or organ's ability to work resulting from performing it.

In general, there are two dominant types of fatigue. This is muscle fatigue, also referred to as physical or local – because it can often be located in a specific place, e.g. in the upper or lower limb. Another type of fatigue is central nervous system fatigue, also referred to as central fatigue, because it is difficult to locate any specific place where it occurs, and it usually covers the entire body.

- Muscle or local fatigue:
  - is a type of fatigue leading to a temporary decrease in the performance of a specific muscle group,
  - causes disorders in the so-called synaptic conduction (in neuromuscular junctions), as a result of the toxic effects of muscle metabolism products (elevated concentration of lactic acid and pyruvic acid in the muscle tissue),
  - occurs during high-intensity work,
  - the effects of muscle fatigue can be removed by providing more oxygen, for example, by massage.
- Central nervous system fatigue or central fatigue:
  - is a type of fatigue including general physical fatigue of the body,
  - mental work fatigue,
  - fixation of the organ of vision on one point or repeatable psychomotor activities,
  - occurs when performing monotonous work,
  - finally, chronic fatigue resulting from the accumulation of various forms of fatigue,
  - occurs with low-intensity work that strains the body for a long time,
  - removing the effects of nervous fatigue typically requires longer periods of rest.

It is generally assumed that a person working physically under normal conditions does not use more than 30-35% of their maximum capacity. Working within 35-50% of one's capacity requires additional motivation from the employee and such effort leads to both mental and physical fatigue. However, working at the capacity level of 65% or higher results in exceeding the so-called “mobilization threshold” and it requires releasing energy reserves (Grandjean, 1971; Mansberg, Thompson, 2008).

Fatigue triggers related phenomena that affect the tasks performed by the employee, in many cases. They include:

- slowing down the transfer of stimuli,
- decreasing the level of attention,

- difficulty thinking (brain fog),
- reducing the acuity of perceiving phenomena through the organs of senses,
- decreased functional (psychomotor) capacity,
- changing the excitability threshold for reflex reactions,
- impairment of the coordination role of nervous centers,
- functional disorders of the cortical part of the adrenal glands.

In general, the symptoms of fatigue can be divided into two types: objective and subjective.

- The objective symptoms include work efficiency fluctuations. These symptoms include, among others: an increase in production defects, more and more frequent mistakes, various types of omissions, damage to tools, accidents at work, etc.
- Subjective symptoms include: pains in intensely working muscles, a feeling of general weakness and irritability or depression, and states of fatigue occurring especially during monotonous work.

Objective symptoms of fatigue can and often are noticeable to those around you, especially to your co-workers. However, subjective symptoms are only felt by a tired person and may not always be noticed by those around them.

Outstanding researcher of the subject H. Kirschner distinguishes the following forms of fatigue:

- Acute fatigue – resulting from very intense muscular or neural and mental effort, which in turn leads to the state of (although transient) exhaustion. It appears if effort is irrationally distributed as well as in emergency situations. Acute mental (nervous) fatigue may occur in traffic controllers, dispatchers, etc.
- Moderate fatigue – occurs while working with medium intensity, but for a long time. This is a completely normal and reversible phenomenon.
- Severe fatigue – occurs when the states of fatigue overlap, when the rest insufficiency is serious. This is a disease-like situation. It results in bad mood, depression, poor appearance, sleep disturbance or many other symptoms.
- Weariness – this is the exhaustion of human working potential. To regain the potential, we have to rest. However, we often experience fatigue without exhaustion of working potential – it occurs especially when we are bored with work or, for example, in the states of alienation.
- Mental fatigue – manifests in the inhibition of activity of cortical centers, which results in relaxation of attention, slowing down and inhibiting the ability to observe, reducing the body dynamism as well as physical and intellectual fitness. The mental fatigue is due to many different reasons. It is different from physical fatigue, which is rather easy to combat and remove. The effects of mental fatigue are quite severe and make our everyday life difficult. Knowing how to recognize the symptoms of this type of fatigue helps keep your body's cognitive functions at the appropriate level. The lack of

motivation to act and the feeling of an excessive workload are the first signals of mental exhaustion. Special cases that require intensive work include mental fatigue in the professional sphere and toxic relationships (Aaron et al., 2001; Chojnacka-Szawłowska, 2009; Sęk, 1991; Gembalska-Kwiecień, 2017; Gros, 1994).

### 3. Methods of measuring fatigue

Moving on to the next issue, which is the measurement of fatigue, I will quote renowned physiologist G. Lehmann who maintained – “measuring fatigue is practically impossible. There are no methods that could measure both the phenomena of fatigue in individual muscle groups and the processes of fatigue manifesting themselves in the central nervous system or in the autonomic nervous system”.

The above opinion could end the considerations related to the topic of fatigue measurement, but for the sake of accuracy, below we will present a brief description of currently used methods.

At first, you have to determine what type of fatigue you deal with.

Muscle fatigue:

- one can try to determine the blood level of lactic acid generated as a result of physical effort. The greater the concentration, the higher the level of fatigue. However, the load of muscular system may be uneven, and in extreme cases, the load on one muscle may lead to the interruption of work, while the amount of lactic acid will be relatively low,
- determining the level of muscle fatigue based on the pulse rate – you can also try to measure, for example, the pulse rate or the amount of air flowing through the lungs. However, by measuring the pulse rate, we are not able to eliminate other causes of elevated pulse rate.

Central (nervous) fatigue: measuring central fatigue is very difficult and complicated and can only be performed in an indirect way:

- critical flicker frequency (CFF) – uses a phenomenon related to the observation of a flickering source of light stimuli. For example, a person who notices flickering at the beginning of a film show, no longer notices it at the end of screening. More detailed research has shown that the above phenomenon occurs in three phases: initially, the frequency increases (in the phase corresponding to the introduction to work), then it decreases, and finally, at the end of the shift, it increases again under the influence of significant stimulation. This three-phase nature can be observed during both physical and mental work;

- electrical activity of the cerebral cortex – the above activity is recorded by EEG machines showing the frequency and amplitude of the waves emitted by the cerebral cortex. The so-called alpha index decreases significantly in the initial phase of work and then gradually increases. This may refer to the gradual development of inhibition processes under the influence of increasing fatigue. This phenomenon is very similar during mental and physical work;
- reaction time – it was found that one of the criteria for determining fatigue may be the extended response time to incoming stimuli, and above all, the delay in conscious movements controlled by the cerebral cortex motor centers. The research performed shows that immediately after starting a shift, the response time is slightly longer than the accepted reference, but after two hours of work it becomes slightly shorter. However, a significant time reduction occurs after the 15-minute break (after the 4th hour of work), in subsequent working hours the response time gradually increases, reaching its maximum at the end of the shift;
- the value of sensitivity and difference thresholds – this is a mental work specific criterion for analyzers. The test involves examining the sensitivity threshold to determine the lowest stimulus level that triggers the analyzer's response, or difference (sensitivity) threshold to determine the smallest noticeable difference between the intensity levels of two stimuli. These thresholds increase along with the increase of fatigue. However, it should be noted that the value of thresholds is also affected by other factors, e.g. environmental conditions, motivation, etc.;
- precision of sensorimotor activities – the test involves measuring the precision of eye-hand coordination or other sensorimotor activities. The decrease in precision reflects the state of mental fatigue (Zaborowski, 1985; Zimmerman et al., 2015; Zużewicz, 2022; Urbańska, 2010; Stoffregen et al., 2019).

#### **4. Fatigue and its symptoms**

Many factors can cause the severe fatigue of the body. Apart from strictly health-related aspects that are not a consequence of any disease, severe fatigue is usually temporary. However, under no circumstances should we ignore it. The severe fatigue can be simply defined as various overlapped states of fatigue that occur under conditions of insufficient rest. The phenomenon itself is similar to some disease conditions. It can manifest itself as poor well-being, depression, sleep disturbances, constant fatigue, and sometimes even poor physical appearance.

Body fatigue is largely caused by depleting energy reserves. If we feel tired, it means that our body is rebelling, it wants to tell us that we should slow down or just have a rest – this is a simple way of trying to get us back in order. This is a physiological reaction that protects our body against working too much.

It is believed that the most frequent cause of severe fatigue results from taking on too many responsibilities in professional and private life, for which we simply do not have time during the day. As a result, our brain works constantly at the highest speed, and the body does not have time to regenerate, because we do outstanding things at the expense of sleep, and the brain has practically no time to rest. The brain does not slow down even during sleep, because we lie down with our heads filled with thoughts and unfinished tasks. As a result, we do not enter the deep sleep phase, which in turn takes our life energy away the next day. If this situation persists, it may lead to serious consequences and cause many diseases. Therefore, it is so important to find a balance.

Our country is one of the countries where people work the most. Despite the statutory eight hours a day, Poles often work overtime. Some people additionally work at home. This is the way plain body fatigue turns into severe fatigue. It should be noted that long-term mental and physical severe fatigue can lead to serious health problems (De Drue, Gelfand, 2008).

The most common symptoms of body severe fatigue are:

- Sleep problems, both insomnia and excessive sleepiness, sleep is unable to regenerate the body:

long-term stress and focus on professional duties can make it difficult to fall asleep, resulting in waking up during the night and leading to problems with getting up. Sleep deficit increases the symptoms of severe fatigue, which is why your well-being and health deteriorate week by week. Disturbing thoughts make it difficult to enter the deep sleep phase, it does not allow reducing the level of stress hormone cortisol, which induces frequent waking up during the so-called restless sleep. Excessive daytime sleepiness and sleep disorders are the first alarm signals sent by our body.

- Apathy and frequent mood swings:  
indifference to external factors and reluctance to start any activity – these are other symptoms of fatigue that should prompt you to take care of your health. Apathy, manifested by severe depression and a decrease in involvement in everyday duties that previously did not cause any problems, may cause tension in the workplace. Sometimes it may also manifest itself as an excessive, unjustified state of excitement and nervous arousal. Bad mood, lack of interests, depression, feeling nervous, reluctance, loudness, blocking thoughts, which results in problems with decision-making process, concentration and motivation. Such problems increase proportionally with the feeling of severe fatigue.

- Frequent recurrent infections (poor body immunity):  
the body can signal severe fatigue in many ways. Recurrent colds, various types of infections, low-grade fever, herpes and other skin diseases – if we often experience such symptoms, it is worth not only considering a vitamin supplementation, but also undergoing thorough medical tests.
- Headaches, migraines and dizziness:  
other somatic symptoms of fatigue include nervous system problems – headaches of varying severity, as well as migraines with accompanying symptoms such as photophobia, nausea or dizziness. In the event of these and other physical problems, you should always first carefully have your entire body examined and consult a doctor to rule out any underlying diseases.
- Decreased intellectual efficiency (reduction in the level of intellectual functioning):  
exhaustion impairs concentration, ability to remember and encourages making mistakes. Work overload may lead to much poorer capability of performing duties and tasks entrusted to us, and thus reduce the quality of our work. Sometimes such situations have serious consequences. Failures at work and dissatisfaction of superiors, in turn, translate into increasing the feelings of depression and stress.
- Poorer work efficiency (disorganization and decreased work efficiency):  
another sign of severe fatigue is spending too much time on individual tasks. This results from the symptoms mentioned above, including difficulty concentrating, distraction, reduced intellectual performance, or more frequent mistakes.
- Lack of satisfaction at work, occupational burnout problems:  
the work that used to give us satisfaction begins to irritate and tire us, and as a result we are unable to come to work. We run away from any tasks and professional challenges. The work we do makes us feel almost physically uncomfortable and, consequently, unable to continue doing it.
- Eating disorders, nausea, abdominal pain:  
digestive problems are often one of the symptoms of severe fatigue. They manifest themselves in various eating disorders, and may also include nausea, vomiting, and severe or chronic stomach aches.
- Skin discoloration:  
this symptom is not frequently associated with fatigue, but as numerous studies have shown, fatigue may manifest itself in this type of symptoms.
- Excessive sweating:  
sometimes excessive sweating, especially if we have not noticed such symptoms earlier, may indicate fatigue, increased stress or even related pain sensations (Maslach, 1994; Heimpel et al., 2006; Knight et al., 2010).



## 5. Costs of fatigue

Among the many factors that directly or indirectly affect the quality of managerial staff work, one of the last one considered is often fatigue, which affects everyone, both physically and mentally. Each of us becomes exhausted to a greater or lesser extent after work, and the more time during the day we spend on working, the more tired we become.

Polish employers – obviously not all of them – often perceive work fatigue as an individual problem of a specific employee. They often see it as a lack of organizational skills or insufficient commitment in the subordinate, forgetting about the huge number of assigned duties and tasks to be performed. In addition, in some cases there is also shift work, which also, to a large extent, may contribute to the body's severe fatigue. Research from the last twenty-five years shows that cumulative fatigue combined with shift work, especially at night, leads to an increased risk of diseases such as hypertension, digestive system disorders and long-term insomnia. In addition, companies relying on high work productivity rate can be severely affected when employees are chronically tired, mainly due to a drop in the efficiency of the staff operating the production lines, but also due to the higher risk of accidents, being costly in every aspect.

It should be also noted that overworked employees generate huge costs. Numerous studies and calculations indicate that work-related fatigue consumes significant financial resources in many organizations.

Employees' severe fatigue directly correlates with many aspects, including:

- the costs of production downtimes,
- sick leave score,
- productivity drops,
- increased level of product complaints,
- reduced operating profit.

Unawareness often results in employers not taking proper care of this aspect of work, thus exposing themselves to high overhead costs due to human fatigue.

One of the elements of responsible employee management performed by appropriate managerial staff should be ensuring employees' concentration on work and involvement, among others, through appropriate scheduling, not piling up tasks and providing good working conditions. We should always take into account the costs of work-related fatigue, aspects of monitoring this factor among staff, as well as building solutions to these problems. It is time to understand that high costs, risks and responsibility for people caused by long-term work-related fatigue is unacceptable and should be financed as part of running a responsible business (Strelau, Zawadzki, 2008; Kowalski, 2024; Taylor, 2010; Telzer, 2009).

## 6. Profession-dependent work rhythms

Many professions involve working at regular, but sometimes very unusual hours, as is in the case of bakers, printers, food and staple product suppliers in large urban agglomerations, who also perform their tasks at night. On the other hand, milkmen and postal sorting employees work in the early morning hours, while health care workers, mid-level practitioners and doctors decide about the lives and health of patients all day and night – the same applies to services responsible for public safety, including the police, city guards, fire fighters and others, they all work 24/7 (Gembalska-Kwiecień, 2017; Witkowski, 1994).

Performing the above professions determines working hours. We can often set the rhythm of our work, but for some reasons we do not always choose the one that is optimal for our body.

Below we present the list of the most popular work rhythms used by employees:

- Machine rhythm – an employee works equally well and in the same rhythm from the beginning to the end of the shift; such people, working “like a machine”, and according to physiologists are not the best employees at all.
- Extreme-spurt rhythm – frequent changes in the employee's performance are observed; going from a very fast pace to a slow pace and back again; work is nervous, jumping from one extreme to another, this mode of working is very unfavorable, leads to rapid fatigue and causes neurasthenic symptoms in the employee (the feeling of inability to cope with work).
- Physiological rhythm – the employees adjust the work pace to the physiological rhythm; they go through the phase of getting used to work (warm-up), which usually lasts about 30 minutes, then their work efficiency constantly increases up to a certain maximum; around noon there is a drop in performance, while in the afternoon it increases again, but without reaching the morning peak, and then it decreases until the end of the shift.

## 7. Conclusions

One of the priorities in shaping desired organizational behavior is maintaining high efficiency and quality of work. There is no doubt that both efficiency and quality are determined by the employee's well-being. And this is very low if the employee is tired. This results in a significantly reduced efficiency at work. The states of fatigue also affect private life, reducing its quality. They make it difficult to function and cause concentration problems. They also increase the risk of accidents, defects or mistakes at work. Fatigue itself is not a disease. It is just a symptom. Often, the feeling of weariness or sleepiness during the day is just a signal sent by the body encouraging us to take some rest and get enough sleep.

Periods of temporary fatigue or even exhaustion happen to everyone, and there is usually a reason behind it that is worth identifying and addressing. When we become feeling tired, drowsy, weak or deprived of energy, it is good to simply listen to our body and have some rest. However, it should be noted that if the fatigue persists for a longer period, we should consult a doctor. According to general practitioners, chronic fatigue, which persists for no apparent reason, is currently one of the most common health problems reported by their patients. Unfortunately, diagnosing and treating this condition is not easy due to the large number of possible causes and risk factors (Gembalska-Kwiecień, 2017; De Drue, Gelfand, 2008).

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## References

1. Aaron, L.A., Herrel, R., Ashton, S., Belcourt, M., Schmalings, K., Goldberg, J., Buchwald, D. (2001). Comorbid clinical conditions in chronic fatigue: a co-twin control study. *Journal of General Internal Medicine*, 16(1), 24-31.
2. Auster, E.R., Wylie, K.K., Valente, M.S. (2005). *Strategic Organizational Change: 14 Building Change Capabilities in Your Organization*. New York: Palgrave Macmillan.
3. Chojnacka-Szawłowska, G. (2009). *Zmęczenie a zdrowie i choroba. Perspektywa psychologiczna*. Kraków: Impuls.
4. De Drue, C.K.W., Gelfand, M.J. (2008). Conflict in the Workplace: Sources, Functions, and Dynamics Across Multiple Levels of Analysis. In: C.K.W. De Drue, M.J. Gelfand (eds.), *The Psychology of Conflict and Conflict Management in Organizations*. New York.
5. Gembalska-Kwiecień, A. (2017). *Czynnik ludzki w zarządzaniu bezpieczeństwem pracy w przedsiębiorstwie. Wybrane zagadnienia*. Gliwice: Wydawnictwo Politechniki Śląskiej.
6. Grandjean, E. (1971). *Fizjologia pracy. Zarys ergonomii*. Warszawa: Państwowy Zakład Wydawnictw Lekarskich.
7. Griffin, R.W. (2002). *Podstawy zarządzania organizacjami*. Warszawa: PWN.
8. Gros, U. (1994). *Organizacyjne aspekty zachowania się ludzi w procesach pracy*. Katowice: Wydawnictwo Akademii Ekonomicznej.

9. Heimpel, S., Elliot, A., Wood, J. (2006). Basic personality dispositions, self-esteem, and personal goals: An approach-avoidance analysis. *Journal of Personality*, 74, 1293-1319.
10. Jordan, K.M., Landis, D.A., Downey, M.C., Osterman, S.L., Thurm, A.E., Jason, L.A. (1998). Chronic Fatigue Syndrome in Children and Adolescents: A Review. *Journal of Adolescents Health*, 22, 4-8.
11. Killoren, S.E., Wheeler, L.A., Updegraff, K.A., Rodríguez de Jesús, S.A., McHale, S.M. (2015). Longitudinal Associations among Parental Acceptance, Familism Values, and Sibling Intimacy in Mexican-Origin Families. *Family Process*, 54(2), 217-231.
12. Knight, G.P., Gonzales, N.A., Saenz, D.S., Bonds, D.D., German, M, Deardorff, J. et al. (2010). The Mexican American Cultural Values Scales for adolescents. *Journal of Early Adolescence*, 30(3), 444-481.
13. Kowalski, H. (2024). <https://hrstandard.pl/2019/10/08/jak-dlugotrwale-zmeczenie-praca-wplywa-na-pracownikow-i-pracodawce>
14. Mansberg, G., Thomson, A. (2008). *Zespół przewlekłego zmęczenia. Jak odzyskać energię – porady lekarzy praktyków*. Warszawa: Klub dla Ciebie.
15. Maslach, C. (1994). Wypalenie się: utrata troski o człowieka. In: P.G. Zimbardo, F.L. Ruch (eds.), *Psychologia i życie*. Warszawa: PWN, 623-627.
16. Reiman, A., Pedersen, L.M., Väyrynen, S., Sormunen, E., Airaksinen, O., Haapasalo, H.A. (2019). Safety Training Parks – Cooperative Contribution to Safety and Health Trainings. *International Journal of Construction Education and Research*, 1, 19-41.
17. Sęk, H. (ed.) (1991). *Spółeczna psychologia kliniczna*. Warszawa: PWN.
18. Stoffregen, S.A., Giordano, F.B., Lee, J. (2019). Psycho-socio-cultural factors and global occupational safety: Integrating micro- and macro-systems. *Social Science and Medicine*, 226, 153-163.
19. Stoner, J.A.F., Wankel, Ch. (1997). *Kierowanie*. Warszawa: PWE.
20. Strelau, J., Zawadzki, B. (2008). Psychologia różnic indywidualnych. In: J. Strelau, D. Doliński (ed.), *Psychologia. Podręcznik akademicki, t. 1* (pp. 765-846). Gdańsk: Gdańskie Wydawnictwo Psychologiczne.
21. Taylor, M. (2010). Does Locus of Control Predict Young Adult Conflict Strategies with Superiors? An Examination of Control Orientation and the Organizational Communication Conflict Instrument. *North American Journal of Psychology*, 12(3), 455-458.
22. Telzer, E.H., Fuligni, A.J. (2009). Daily family assistance and the psychological well-being of adolescents from Latin American, Asian, and European backgrounds. *Developmental Psychology*, 45, 1177-1189.
23. Urbańska, J. (2010). *Zmęczenie życiem codziennym. Środowiskowe i zdrowotne uwarunkowania oraz możliwości redukcji w sanatorium*. Poznań: UAM.
24. Witkowski, S. (1994). Trening kierowniczy - uczenie się przez doświadczanie. In: S. Witkowski (ed.), *Psychologia sukcesu*. Warszawa: PWN.

25. Zaborowski, Z. (1985). *Trening interpersonalny*. Wrocław: Ossolineum.
26. Zimmerman, J., Morrison, A., Heimberg, R. (2015). Social anxiety, submissiveness, and shame in men and women: A moderated mediation analysis. *British Journal of Clinical Psychology*, 54(1), 1-15.
27. Zużewicz, K. (2022). *Nauka o pracy: bezpieczeństwo, higiena i ergonomia*. CIOP-PIB, <http://archiwum.ciop.pl/15705.html>



## CRISIS IN AN ENTERPRISE – THE EXAMPLE OF A PANDEMIC (FACES, MANIFESTATIONS, MANAGEMENT)

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**Purpose:** The purpose of the study was to answer the questions: were there, in the opinion of employees, unfavourable changes or difficulties in the entities in which they are employed in connection with the COVID-19 pandemic, in what areas of the functioning of the enterprises did they occur, did the management staff take appropriate actions in connection with this, what actions were taken?

**Design/methodology/approach:** In addition to the review of literature on the subject of enterprise crisis and pandemic, the article also presents the results of own empirical research.

**Findings:** As a result of the conducted research, it was found that 60.5% of respondents noticed unfavourable changes or difficulties resulting from the external crisis such as the pandemic. Respondents considered that they were most noticed in the sphere of the company's functioning in the field of personnel management. The next areas were: supply, production, the process of communication between employees and the weakening of the company's/organization's relations with business partners, as well as marketing. 33.5% of surveyed employees reported that the management staff showed activity in such a difficult, crisis reality as the pandemic. The actions taken in this area were shown.

**Research limitations/implications:** The selection of the research sample was not probabilistic, but care was taken to ensure a high diversity of respondents, both in terms of the characteristics of the economic entities surveyed and the respondents themselves.

**Practical implications:** Recommendations for managers facing major changes, as was the case with the pandemic, a specific example of an external crisis.

**Social implications:** Showing that in the face of an external crisis such as the pandemic, the integration of intra-organizational activities and building relationships with the company's environment can significantly mitigate unfavourable phenomena.

**Originality/value:** A comprehensive look not only at the need for a thorough analysis of the causes and conditions of crises in the enterprise but also an indication of taking systematic corrective actions with particular consideration of aspects related to the area of human resources management. Showing that cooperation between the enterprise and its environment based on values can contribute to the creation of a good of a general social nature, also in crisis situations.

**Keywords:** crisis, pandemic, enterprises, employees, management.

**Category of the paper:** Research paper.

## 1. Introduction

“We live in an era of instability. A number of contradictory systemic factors that have been operating for a long time are causing constant changes in the dynamics of the world of work and, consequently, our way of looking at it, generating a constant need for new interpretative models” – this is how D. Villa (2021, p. 113) describes the situation of enterprises navigating “the stormy sea of business”. Business entities operating in the era of globalization face various challenges. According to J.E. Stiglitz (2006, p. 26), globalization “is essentially a closer integration of states and people in the world, caused by a huge reduction in transport and telecommunications costs and the abolition of artificial barriers to the flow of goods, services, capital, knowledge and (to a lesser extent) people from country to country”. Another approach indicates that: “Globalization is a phenomenon and process of internationalization, and at the same time of growing political, social, economic, technological and information interdependence encompassing the entire world. (...) the life and development of individual societies are increasingly influenced by external factors, and less by local factors. It means an increase in interdependence, market and competition, and a decrease in the importance of socio-political factors in economic life” (Bossak, 2006, p. 61).

Globalization has left its mark on the economic sphere, causing changes noticeable in technological progress, has led to the dynamism of economic growth, but also, which is very clearly observable, deepens development disparities and social inequalities (Anioł, 2022). According to J.E. Stiglitz, globalization “does not serve to ensure the stability of the world economy” (p. 192). It is worth looking at the functioning of enterprises in the face of phenomena and processes that are related to changes on such a wide scale of their impact. This area of issues is becoming very important from the perspective of the management staff and employees of other levels of management. The voice of employees is important, because the perception of the functioning of an economic entity in the context of overcoming all crises/difficulties, both internal and external, is a “barometer” of the efficiency of the organization. The manifestations of such changes in the environment include the COVID-19 pandemic.

Changes of such great impact have affected many areas of business operations. This has had an impact on employee behaviour.

The aim of this article is to answer the following questions:

1. According to employees, have there been any adverse changes or difficulties related to the pandemic?
2. In what areas of the company’s operations have they occurred?
3. Do employees believe that management has taken action in connection with adverse changes or difficulties resulting from the COVID-19 pandemic?
4. What actions have been taken?



The article presents the results of empirical research conducted among respondents employed in enterprises and organizations in the Lubuskie voivodeship. The research was conducted using a survey questionnaire. The study uses empirical research conducted in the period from April to September 2023 on a group of people employed in the Lubuskie voivodeship.

## **2. Crisis in an enterprise – its essence, determinants, ways of fighting the crisis**

The term crisis means, among other things: “the collapse of the process of economic growth and regression in the economic development of the state (...), the disruption of some system of values or the position of something” (Wielki słownik wyrazów obcych, 2022, p. 702).

According to J. Walas-Trębacz (2011, p. 9): “A crisis is considered one of the basic phenomena accompanying the development of an enterprise and contributes to changes in the functioning of the organization or determines its survival”. What is a crisis and what can be its conditions? Analyzing various definitions of a crisis and indicating its genealogy, it is possible to see its multiple sources. The simplest division should be related to conditions inside and outside the organization. Among the factors of an internal nature in relation to the entity that is the enterprise/organization, the following are indicated: conflicts, low management efficiency, inappropriate management style, disproportions between the goals and resources of the organization, mismatch of strategy. In the group of external factors, it is possible to find, for example, a macroeconomic crisis, the size of competition on the market, the level of income of the population and random factors (fire, drought, flood, etc.) (Walas-Trębacz, 2011, p. 48).

Referring to the phenomenon of crisis in selected management concepts, it is worth mentioning its foundations, such as (Dziurski, Kozłowska, 2016):

- crisis is related to the development of the organization according to L.E. Greiner,
- managerial trend represented by A. Berle and G. Means,
- resource concept of the organization,
- theory of value management for stakeholders,
- concept of management in crisis.

J. Walas-Trębacz (2011, p. 43), citing C.M. Person and J.A. Clair, believes that when addressing the subject of crises and management in such conditions, it is worth focusing on four issues – 4C, i.e.: causes (reasons – internal and external categories of impact), consequences (effects with a different time perspective), caution (a warning system focused on minimizing effects) and coping (solutions – response to the crisis). Referring to possible forms of overcoming a crisis in an enterprise, it is worth indicating, for example, such methods as (Jasińska, 2017, p. 35): restructuring, liquidation and bankruptcy. The first solution includes

internal remedial actions as well as the sale of the company or its part. Bankruptcy may be connected with the possibility of concluding an arrangement or lead to the liquidation of the company. According to J. Walas-Trębacz (2011, p. 67), the crisis management organization system should be characterized by such features as, among the others: diversification of organizational forms, intensification of integration processes, flexibility and adaptability, which are characteristic of organizational structures. K. Krzakiewicz (2004, p. 44), presenting the style of anti-crisis management, indicates that it should be manifested in: trust in professionalism, concentration on the implementation of general goals, supporting independent initiatives, selecting appropriate collaborators and, which is particularly worth paying attention to, shaping an organizational culture based on general values.

Of no small importance in the area of management in an enterprise, in a situation where the crisis has already been averted, is ensuring that “constant monitoring of areas in which the crisis occurred is implemented and conclusions are drawn from it also for other areas of activity important for the organization” (Makowski, Danowski-Żdziebło, 2016). How has the COVID-19 pandemic, which is a kind of global crisis situation, affected the functioning of enterprises?

### **3. The impact of the pandemic on the functioning of enterprises**

Faced with the COVID-19 pandemic, many enterprises experienced the force of its impact, which was observed as a slowdown in their activity. Enterprises were not prepared for the challenges of reality, which the pandemic wrote in its “script”. H. Woźniak, A. Kędzierska-Szczepaniak and K. Szczepaniak (2023, p. 368) believe that: “The crisis caused by the COVID-19 pandemic was a huge test for global trade, bringing unprecedented shocks to global supply chains and trade relations”. The scale of unfavourable phenomena was enormous and its degree of impact covered practically all spheres of economic activity in macro-, meso- and micro-levels. Enterprises linked in networks of business dependencies felt the effects of the global crisis in the financial, managerial and social dimensions. These were visible in the scope of B2B and B2C relations and in other dimensions. New social, technological and structural challenges emerged.

The adverse effects of the pandemic were observed in the marketing dimension as well as in the field of employment (Cankurtarana, Beverland, 2020; Hartmanna, Lussier, 2020; Oehmen et al., 2020; Rapaccini et al., 2020). According to M. Gorzelany-Dziadkowiec (2020, p. 3): “The COVID-19 crisis has revealed significant weaknesses in the operations of enterprises and supply chains related to working conditions and preparation for disaster situations”. Due to such a global crisis, it became necessary to conduct an advanced analysis of the resilience to disruptions in the functioning of enterprises (Rapaccini et al., 2020;

Maternowska, 2021). It was necessary to develop adaptive capabilities very dynamically, also through the use of digital technologies (Al-Omousha, Simón-Moya, Sendra-Garcíac, 2020; Katz, Jung, Callorda, 2020; Gorzelany-Dziadkowiec, 2020; Talar, 2022).

Comparative studies of enterprises in relation to their situation before and during the crisis indicated its noticeable impact, among the others, in terms of their operational flexibility (Stawasz, 2021). Moreover, the ability to cope with various forms of risk became an important challenge, which had an impact on making more complex, long-term decisions in conditions of uncertainty (Oehmen et al., 2020). The pandemic led to the creation of a more demanding business environment not only for managers but also for human resources management practitioners, who, in addition to ensuring the maintenance of the business entity's operations, provided effective assistance to employees in dealing with the challenges of this new, exceptional situation (Hamouche, 2020).

Enterprises had to take many proactive actions related to a different approach to resource management or modification of the previous strategy. Improvements in the marketing sphere, in terms of products or services offered on the market, also became important (Guthrie, Fosso-Wamba, Arnaud, 2021). According to M. Szarucki, G. Noga, and O. Kosch (2021), the adaptive flexibility of enterprises triggered the need to search for sources of stability, which included, among other things: enterprise resources, personality traits of the leader, proximity to the market, employee attitude. It was essential not only to emphasize the strategic dimension of the enterprise's functioning (Klößner et al., 2023; Zahoor et al., 2022; Crick, Crick, 2020; Klyver, Nielsen, 2021) but also to build capabilities that can activate and shape the necessary tactical reactions in crisis conditions (Klößner et al., 2023). This included developing the ability to establish trusting relationships with potential cooperation partners in order to engage in a joint response to crises (Klößner et al., 2023). According to J. Grzegorzcyk (2022, p. 23): "Polish enterprises showed particular responsibility during the Sar-CoV-2 coronavirus pandemic, devoting their material resources, skills and knowledge to the fight against the disease".

#### **4. Methods**

In addition to a review of the literature on organizational identity and values, the article also presents the results of own empirical research. They constitute a fragment of research carried out in relation to broader, more comprehensive issues in the field of enterprise management. To ensure the authenticity of the data, participants were informed that the study was anonymous and would be used only for scientific purposes. They were carried out using a survey questionnaire. Some respondents completed it electronically, online, and the rest in paper form. Respondents answered: two single-choice closed questions, one multiple-choice closed

question, and one open question directly related to the subject matter adopted in the article. The selection of the research sample was not probabilistic, but care was taken to ensure a high diversity of respondents, both in terms of the characteristics of the economic entities surveyed and the respondents themselves. The vast majority of those employed are enterprise employees. The study uses empirical research conducted of 200 people employed in the Lubuskie voivodeship from April to September 2023. The characteristics of the study population have been shown in Table 1.

**Table 1.**  
*Characteristics of the studied population*

| Description  |                         | Number of indications as a percentage (in %) |
|--|-------------------------|--|
| <b>Gender of respondents</b>                       | women                   | 44.0   |
|  | men                     | 56.0   |
| <b>Age structure of the respondents</b>            | Up to 30 years old      | 58.5   |
|  | From 31 to 40 years old | 17.5   |
|  | From 41 to 50 years old | 13.0   |
|  | From 51 to 60 years old | 7.0  |
|  | Over 60 years old       | 4.0  |
| <b>Work experience in the company/organization</b> | Less than 1 year        | 18.0   |
|  | From 1 to 5 years       | 49.0   |
|  | From 6 to 10 years      | 16.5   |
|  | From 11 to 15 years     | 6.5  |
|  | From 16 to 20 years     | 4.0  |
|  | Over 20 years           | 6.0  |
| <b>Workplace type *</b>                            | executive               | 73.5   |
|  | managerial              | 28.5   |
| <b>The nature of the work performed*</b>           | physical work           | 54.5   |
|  | mental work             | 65.5   |

Note: \* Some respondents perform both physical and mental work. Moreover, in several cases, employees indicated that they were employed in executive and managerial positions.

Source: own study based on empirical research.

The study involved 44.0% of women and 56% of men. The respondents represented different age groups. 18% of respondents had less than 1 year of work experience, 49% were employed for 1 to 5 years, and only 6% had worked for over 20 years. The vast majority of respondents were employees in executive positions, constituting 73.5% of the respondents. Some of the respondents perform both physical and mental work, therefore the total number of respondents' indications exceeds 100%, with 54.5% of the respondents choosing physical work and 65.5% indicating that they perform mental work. The characteristics of the companies/organizations employing the surveyed respondents are reflected in the table - Table 2.

**Table 2.***Characteristics of enterprises/organizations in which the respondents are employed*

| Description  |  | Number of indications as a percentage (in %) |
|--|--|--|
| <b>The period of operation of the enterprise/ organization on the market</b> | Up to 5 years                                | 23.9   |
|  | From 6 to 10 years                           | 14.5   |
|  | From 11 to 15 years                          | 12.0   |
|  | From 16 to 20 years                          | 12.0   |
|  | Over 20 years                                | 37.6   |
| <b>The geographical scope of the enterprise/ organization's activity*</b>    | Local market                                 | 31.6   |
|  | Regional market                              | 25.6   |
|  | Domestic market                              | 39.3   |
|  | International market                         | 41.9   |
| <b>Type of the enterprise/ organization's activity*</b>                      | Production                                   | 35.9   |
|  | Trade  | 42.7   |
|  | Services                                     | 47.9   |
|  | Others                                       | 12.0   |
| <b>Legal form</b>  | State-owned enterprise                       | 18.0   |
|  | Private enterprise                           | 73.5   |
|  | Other form                                   | 8.5  |
| <b>Capital ownership</b>   | Polish capital                               | 68.4   |
|  | Foreign capital                              | 14.5   |
|  | Mixed capital with a predominance of foreign | 10.2   |
|  | Mixed capital with a predominance of Polish  | 2.6  |
|  | Equal share of Polish and foreign capital    | 4.3  |
| <b>Size of the enterprise/ organization</b>                                  | Micro (less than 10 employees)               | 17.1   |
|  | Small (10 to 49 employees)                   | 24.8   |
|  | Medium (from 50 to 249 employees)            | 18.8   |
|  | Large (more than 249 employees)              | 39.3   |

\* Note: In the case of two areas characterizing the surveyed entities in which the respondents are employed, i.e. with regard to the geographic scope of the activity and the type of activity, the respondents could choose more than one answer.

Source: own study based on the survey research.

The surveyed employees were employed in business entities whose period of operation on the market was varied. The most numerous group were those that existed for over 20 years – 37.6%. The geographic scope was also diversified, some entities were active in more than one market. It was found that the largest group was active on the international market – 41.9%. Most of the surveyed entities are private enterprises (73.5% of the surveyed entities). In terms of capital ownership, Polish capital dominated (68.4% of the analyzed entities).

## 5. Results

The surveyed employees of enterprises/organizations expressed their opinion on whether they noticed any unfavourable changes or difficulties related to the COVID-19 pandemic in their workplace. Their opinions are shown in Table 3.

**Table 3.**

*Respondents' opinions on the occurrence of unfavourable changes or difficulties related to the COVID-19 pandemic*

| Description      |  | Number of indications as a percentage (in %) |
|------------------|--|--|
| Yes              |  | 27.0   |
| Rather yes       |  | 33.5   |
| Difficult to say |  | 7.0  |
| Rather not       |  | 16.0   |
| No               |  | 16.5   |

Source: own study based on the survey research.

Based on the empirical research, it should be stated that 60.5% of respondents noticed unfavourable changes or difficulties resulting from the pandemic, they chose the answer “yes” or “rather yes”. 7.0% of respondents chose the answer “difficult to say”. 32.5% of employees believe “rather no” or “no”. In order to present a more complete picture of the perception of the impact of the deep-crisis phenomenon of the pandemic, the author distinguished the areas of operation of enterprises in which these changes occurred. They are presented in Table 4.

**Table 4.**

*Respondents' opinions on areas where changes or difficulties occurred due to the COVID-19 pandemic*

| Description |   | Number of indications as a percentage (in %) |
|-------------|---|--|
| 1.          | Personnel management  | 27.5   |
| 2.          | Supply  | 19.5   |
| 3.          | Production area   | 19.5   |
| 4.          | The process of communication in the enterprise/organization between employees | 18.0   |
| 5.          | Weakening of the enterprise/organization's relations with business partners   | 16.0   |
| 6.          | Marketing   | 13.5   |
| 7.          | Other area  | 4.5  |

Source: own study based on the results of empirical research.

As it results from the conducted research, the spectrum of areas of functioning of enterprises on which the pandemic left its mark was wide, it included: the sphere of production, supply, marketing, and there were also aspects strictly related to personnel management. Moreover, relations with business partners were considered important. Based on the analysis of the obtained results, it should be stated that respondents considered that in the sphere of functioning of the enterprise in the field of personnel management, unfavourable changes/difficulties resulting from the pandemic were noticed to the greatest extent. This was chosen by 27.5% of respondents. The second and third areas (with the same, in percentage terms, number of indications – 19.5%), chosen by the surveyed employees, were supply and the sphere of production. The next positions were occupied by: the process of communication between employees (18.0% and weakening of relations of the enterprise/organization with business

partners (16.0%). 13.5% of respondents chose the sphere of marketing. 4.5% of indications concerned other areas.

As a result of the conducted research, it was also determined how employees of enterprises/organizations perceive the activity concerning the management staff taking actions in connection with unfavourable changes or difficulties resulting from the COVID-19 pandemic. They are shown in Table 5.

**Table 5.**

*Respondents' opinions on management's actions in response to unfavourable changes or difficulties resulting from the COVID 19 pandemic*

| Description      | Number of indications as a percentage (in %) |
|------------------|--|
| Yes              | 16.0   |
| Rather yes       | 17.5   |
| Difficult to say | 14.0   |
| Rather not       | 10.0   |
| No               | 8.5  |
| Not applicable   | 34.0   |

Source: own study based on the results of empirical research.

33.5% of surveyed employees reported that the management staff demonstrated activity in such a difficult, crisis reality as the pandemic. 14.0% of respondents selected the answer "difficult to say". 10.0% admitted that they rather did not undertake such actions, and 8.5% believed that they did not. 34% of respondents considered the answer "not applicable" to be the most appropriate for their company. The scope of the conducted authorial research also included determining: what actions, in the respondents' opinion, were undertaken by the management staff in connection with the difficulties resulting from the pandemic. The results of the analysis conducted in this area are presented in Table 6.

**Table 6.**

*Examples of actions taken by management staff in connection with difficulties resulting from the COVID-19 pandemic – opinions of surveyed respondents*

| Area of activities related to taking countermeasures in connection with the COVID-19 pandemic | Separate activities                                |
|---|--|
| Healthcare activities   | Masks, gloves                                      |
|   | Disinfectants                                      |
|   | Social distancing                                  |
|   | Periodic testing                                   |
|   | Vaccination points                                 |
|   | Defining employee behaviour procedures at work     |
|   | Adapting work procedures to recommendations        |
|   | Suspension of work during periods of greatest risk |
|   | Limiting the number of customers                   |

Cont. table 6.

|   |   |
|---|---|
| <b>Production and supply activities</b> | Greater pressure to find new suppliers  |
|   | Local sourcing and better purchasing planning   |
|   | Changing suppliers  |
|   | Improving the process of communicating with external entities   |
|   | Reducing production to increase the safety of production workers  |
|   | Fulfilling raw material orders well in advance and with a time limit  |
|   | Reducing the annual production target   |
|   | Expanding the range of assortment and service area  |
|   | Focusing on production, an element of growing interest  |
| <b>Marketing activities</b>             | Introduction of online sales  |
|   | Reducing prices   |
|   | Searching for new channels to reach customers   |
|   | Promoting websites with the company's offer   |
|   | Systematic market monitoring  |
| <b>Work organization activities</b>     | Reconstruction of work systems  |
|   | Introduction of remote work   |
|   | Reconstruction of workstations to ensure distance and a barrier between employees and customers                     |
|   | Introduction of two-shift work  |
|   | Reduction of full-time positions  |
|   | Reduction of part of the hourly rate  |
|   | Installation of shields between workstations  |
|   | Change of working hours, including e.g. reduction of hours  |
|   | Meetings with employees   |
|   | Ensuring that employees do not lose their jobs – maintaining employment   |
|   | Reorganization of the staff work in order to increase sales via electronic means and by fulfilling telephone orders |
|   | Adapting the office space to new realities  |

Source: own study based on the survey research.

The activities presented in Table 6 were divided into four groups. The first group included those resulting from securing appropriate working conditions with employee health in mind. These included solutions such as: masks, gloves, periodic tests, or defining procedures for employee behaviour in the workplace. The second group of activities in the field of production and supply included, among the others: fulfilling raw material orders well in advance and with time division, local sourcing and better planning of purchases, and reducing the annual production target. An area in which unfavourable changes resulting from the COVID-19 pandemic were also noticed was marketing. The respondents indicated, among the others, the introduction of online sales or promotion of websites with the company's offer. As for the last, distinguished group, a wide range of activities was noted, starting from the reconstruction of work systems, through the introduction of remote work, and ending with the adaptation of office space to new realities. In the opinion of the respondents, this is how the pandemic left its mark on the functioning of enterprises.



## 6. Discussion

According to B. Wiczerzyńska (2009, p. 32): “(...) enterprises do not operate in a vacuum – they are “wrapped” in a specific environment that creates a more or less crisis-prone atmosphere around them”. This is exactly what happened in the case of the all-encompassing pandemic, which, as a highly exogenous determinant, changed the course of functioning not only of the business sphere, which the author focuses on in the article, but also influenced other areas of life. In such and other crisis situations and in normal conditions of functioning of companies, it is necessary to strive for: (...) “continuous and flexible updating of the strategic plan”, which will ensure “(...) the desired state in the long term” and influence the value of the strategy, its success or failure” (Kozmiński et al., 2023, p. 155). According to R. Paprocki (2020), p. 45: “The pandemic is therefore as much a threat as an opportunity – companies that respond in a way that ensures continuity of operation and gives their employees a sense of security can ultimately gain multidimensional know-how that will pay off long after the pandemic ends. (...) And this is a strategic task, because culture is the basic integrator of the social structure. Integration is a condition of safety for both societies and companies and a force necessary for survival”.

It is worth adding that in crisis situations such as the COVID-19 pandemic, it would be particularly recommended to lean towards value-based management. According to S. Grochmal (2013, pp. 34-35), organizations that adopt this direction of business orientation in their behaviour should be determined by the following features: building strong interpersonal relationships that trigger people’s motivation “to take mutual responsibility for the success of individual people and the entire organization”, using open dialogue through honest and open communication, consistently practicing declared and proclaimed values, and self-organization and visible involvement of people with strong motivation. It is one of the “barometers” reflecting the quality of employee-employer relations, which “is particularly visible in crisis situations. It is precisely the various difficulties and problems that are a real test of the strength and quality of internal relations” (Moczyłowska, Korombel, Bitkowska, 2017, p. 91). Learning the opinions of employees on the conditions of work in the era of the pandemic, i.e. a situation of an external crisis nature, was important, because the group of factors determining the quality of management includes, for example, (Wawak, 2015): involving employees in management activities, active communication with employees, taking into account their comments in decision-making processes, and developing and implementing clear and fair principles regarding human resources policy and employee development. According to D. Villa (2021), a certain recipe for dealing with the reality of unforeseen events, such as the COVID-19 pandemic, is the practical implementation of solutions proposed by smart working, which is oriented towards the process of continuous learning, readiness to follow the “path of continuous discovery of new things” (p. 89), work organization requiring a “strong critical sense” (p. 99)

related to the use of new software enabling cooperation and communication while striving to take care of interpersonal contacts and maintaining a high level of empathy. According to him, the emergence of new modes of work (including the reorganization of the workspace) is related to a proactive approach to change, it also requires sharing resources and supporting the growth and development of the potential inherent in employees, which in turn contributes to positive transformations in the functioning of the enterprise as a whole.

## 7. Summary

The research results may constitute valuable guidance for management staff in terms of shaping appropriate programs for combating a crisis situation in the enterprise by employees and will also allow for approximation of their level of perception in relation to identification with the work environment in a situation of turbulent changes that may occur in the environment. These undoubtedly included the changes related to the COVID-19 pandemic. It triggered the need to shape high-quality, transparent internal communication in the enterprise (Li, Sun, Tao, Lee, 2021), which is also indicated by respondents who, among the areas of consequences of changes or difficulties in connection with such a crisis situation, distinguished the process of communication in the enterprise/organization between employees. Thanks to this, employees can be significantly supported, thus influencing the reduction of their sense of uncertainty. This is important due to building and maintaining proper relationships with business partners, which, as the research shows, have weakened. In order to increase organizational resilience, which was very important in terms of ensuring the organization's durability in the era of COVID-19 (Ngoc et al., 2021), it was worth taking actions to improve the employee management process. Shaping the right employee attitudes can significantly affect the creation of strong pillars of enterprises not only in times of crisis but also in "normal" conditions of their functioning. The practical dimension of the research carried out can be seen in the area of improving human capital management, because: "It is human capital, i.e. the knowledge, skills and abilities of employees, that are a strategic element in building the competitive advantage of the organization" (Gross-Gołacka, Jefmański, Spalek, 2019, p. 184), also in the face of challenges. Recommendations for management staff in the face of serious changes, as was the case with the pandemic, a specific example of a crisis of a global nature, may be as follows:

1. Attention to shaping authenticity and consistency in the behaviour of management staff, which gives people a sense of predictability and builds relationships based on trust. This is also supported by the development of efficient communication, including an indication of the understanding of the context of the message by recipients – lower-level employees and receiving feedback (this is about feedback) (Prokopowicz, Drzewiecki, 2021, pp. 153-155).
2. The panacea for crisis management in teams, organizations/enterprises is to strive to “(...): develop a culture of long-term relationships and mutual kindness” (Prokopowicz, Drzewiecki, 2021, p. 30).
3. Treating employees subjectively, which will ensure success in the process of fighting any crises, such as the pandemic.
4. Implementing programs that shape well-being in the organization, among the others, by improving safety at work, developing social competences of employees (building positive relationships), developing competences related to coping with stress, or shaping clear procedures in the workplace (Staszkiwicz, Klimkiewicz, Beck-Krala, 2023).
5. Due to the fact that, as stated by M.A. Jaworek, T. Marek, W. Karwowski, (2020, p. 1): “Interest in the field of emotions in the workplace continues to grow. It is worth considering conducting research on affective states in organizational settings – “exists for the examination of affective states in organizational settings”, as this can provide valuable information on the perception of conditions and relations prevailing in the enterprise/organization.
6. Faster exchange of acquired practical knowledge in the field of navigating the world of new technologies, organizing various types of training in this field.
7. The management staff should place great emphasis on improving internal communication, also in terms of compliance with the principles of information flow security, which will also have a positive impact on shaping relations with broadly understood external stakeholders.
8. It should be remembered that employee satisfaction will pay off (also in such exceptionally difficult situations for the company) by shaping increased integrity of internal customers – employees and contributes to the increase in the effectiveness of programs that help build the satisfaction of external customers – final recipients – customers.
9. Considering the possibility of organizing work in the enterprise based on the idea and recommendations of smart working (Villa, 2021).
10. Considering the important direction of development of contemporary organizational models towards “increasing the importance of knowledge resources at the expense of material resources” (Sitko-Lutek, Skurzyńska-Sikora, 2016).

11. Ensuring proper shaping of the strategy and its continuous updating, because as A. Koźmiński, D. Jemielniak, D. Latusek-Jurczak, A. Pikos (2023, p. 155) state: “The strategy is intended to prevent costly and ineffective development due to crisis and to spare sudden shocks and revolutions”.
12. Many problems noted in crisis situations can be solved by cooperating with the environment. Taking action in this area requires “listening” to its needs, building a map of stakeholders and also being guided by values oriented towards creating a good of a general social nature. This will ensure the creation of a “bridge” connecting the realities of today with the future vision of the enterprise’s development.

Further research may be aimed at demonstrating what differences exist in the perception of the workplace in crisis situations of endogenous and exogenous origin in the context of building intra-organizational relations with respect to representatives of different age groups, which can be related to the division into generations X, Y, and Z.

## References

1. Al-Omouh, K.S., Simón-Moya, V., Sendra-García, J. (2020). The impact of social capital and collaborative knowledge creation on e-business proactiveness and organizational agility in responding to the COVID-19 crisis. *Journal of Innovation & Knowledge*, Vol. 5, Iss. 4, pp. 279-288, <https://www.sciencedirect.com/science/article/pii/S2444569X2030038X>, 16.08.2024.
2. Anioł, W. (2002). *Paradoksy globalizacji*. Warszawa: Oficyna Wydawnicza ASPRA-JR.
3. Bańka, M. (Ed.) (2022). *Wielki słownik wyrazów obcych*. Warszawa: PWN.
4. Bossak, J.W. (2006). *Systemy gospodarcze a globalna konkurencja*. Warszawa: Oficyna Wydawnicza Szkoła Główna Handlowa w Warszawie.
5. Cankurtarana, P., Beverland, M.B. (2020). Using design thinking to respond to crises: B2B lessons from the 2020 COVID-19 pandemic. *Industrial Marketing Management*, 88, pp. 255-260.
6. Crick, J.M., Crick, D. (2020). Coopetition and COVID-19: Collaborative business-to-business marketing strategies in a pandemic crisis. *Industrial Marketing Management*, Vol. 88, pp. 206-213, <https://doi.org/10.1016/j.indmarman.2020.05.016>, 16.08.2024.
7. Dziurski, P., Kozłowska, I. (2016). Kryzys organizacji w wybranych koncepcjach ekonomii branży oraz zarządzania, In: M. Romanowska, P. Dziurski (Eds.), *Anatomia kryzysu w przedsiębiorstwie* (pp. 25-44). Warszawa: Oficyna Wydawnicza SGH-Szkoła Główna Handlowa w Warszawie.
8. Gorzelany-Dziadkowiec, M. (2020). Zmiany zachowań konsumentów w dobie COVID-19. *Problems of Economics and Law*, Vol. 5, No. 2, pp. 1-15.

9. Grochmal, S. (2013). *Paradygmat jedności w kontekście zarządzania organizacjami*. Rzeszów: Wydawnictwo Uniwersytetu Rzeszowskiego.
10. Gross-Gołacka, E., Jefmański, B., Spałek, P. (2019). *Kapitał intelektualny przedsiębiorstw w Polsce – wybrane aspekty teoretyczne i praktyczne*. Warszawa: PWE.
11. Grzegorzczak, J. (2022). Wyzwania społecznej odpowiedzialności biznesu w warunkach kryzysu. In: A. Walasik, H. Ziętara (Eds.), *Zrównoważony rozwój w kontekście współczesnych zmian społeczno-gospodarczych*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.
12. Guthrie, C., Fosso-Wamba, S., Jean Brice Arnaud, J.B. (2021). Online consumer resilience during a pandemic: An exploratory study of e-commerce behavior before, during and after a COVID-19 lockdown. *Journal of Retailing and Consumer Services*, Vol. 61, 102570, <https://doi.org/10.1016/j.jretconser.2021.102570>, 16.08.2024.
13. Hamouche, S. (2020). COVID-19 and employees' mental health: Stressors, moderators and agenda for organizational actions. *Emerald Open Research*, 2(15), <https://doi.org/10.35241/emeraldopenres.13550.1>, 2.01.2023.
14. Hartmann, N.N., Lussier, B. (2020). Managing the sales force through the unexpected exogenous COVID-19 crisis. *Industrial Marketing Management*, 88, pp. 101-111.
15. Jasińska, J. (2017). *W poszukiwaniu elastyczności. Kierunki zarządzania sytuacją kryzysową w przedsiębiorstwie*. Katowice: Sophia.
16. Jaworek, M.A., Marek, T., Karwowski, W. (2020). The scale of Work-Related Affective Feelings (WORAF). *Applied Ergonomics*, Vol. 82, January, 102945; <https://doi.org/10.1016/j.apergo.2019.102945>, 31.07.2024, pp. 1-9.
17. Katz, R. Jung, J., Callorda, F. (2020). Can digitization mitigate the economic damage of a pandemic? Evidence from SARS. *Telecommunications Policy*, Vol. 44, Iss. 10, 102044, <https://doi.org/10.1016/j.telpol.2020.102044>, 16.08.2024.
18. Klöckner, M., Schmidt, C.G., Wagner, S.M., Swink, M. (2023). Firms' responses to the COVID-19 pandemic. *Journal of Business Research*, Vol. 158, 113664, <https://doi.org/10.1016/j.jbusres.2023.113664>, 31.07.2024.
19. Klyver, K., Nielsen, S.L. (2021). Which crisis strategies are (expectedly) effective among SMEs during COVID-19? *Journal of Business Venturing Insights*, Vol. 16, e00273, <https://doi.org/10.1016/j.jbvi.2021.e00273>, 16.08.2024.
20. Koźmiński, A.K., Jemieliński, D., Latusek-Jurczak, D., Pikos, A. (2023). *Zarządzanie. Nowe otwarcie*. Warszawa: Poltext.
21. Krzakiewicz, K. (2004). Zarządzanie antykryzysowe w systemie zarządzania przedsiębiorstwem. In: J. Skalik (Ed.), *Zmiana warunkiem sukcesu. Organizacja a kryzys*, No. 1054 (pp. 40-46). Wrocław.
22. Makowski, Ł., Danowski-Żdziebło, B. (2016). *Najważniejsze pojęcia związane z kryzysem i zarządzanie nim, Kryzysy organizacji upowszechnionej w social mediach. Przykłady i rozwiązania*. Poznań: Wydawnictwo Wyższej Szkoły Bankowej w Poznaniu.

23. Maternowska, M. (2021). Zmiany w łańcuchach dostaw spowodowane pandemią. Wybrane zagadnienia. In: N. Iwaszczuk (Ed.), *Wyzwania gospodarcze w czasie pandemii*. Kraków: Wydawnictwa Akademii Górniczo-Hutniczej im. Stanisława Staszica w Krakowie, pp. 25-31.
24. Moczydłowska, J.M., Korombel, A., Bitkowska, A. (2017). *Relacje jako kapitał organizacji*. Warszawa: Difin.
25. Ngoc Su, D., Luc Tra, D., Thi Huynh, H.M., Nguyen, H.H.T., O'Mahony, B. (2021). Enhancing resilience in the Covid-19 crisis: Lessons from human resource management practices in Vietnam. *Current Issues in Tourism*, pp. 1-17.
26. Oehmen, J., Locatelli, G., Wied, M., Willumsen, P. (2020). Risk, uncertainty, ignorance and myopia: Their managerial implications for B2B firms. *Industrial Marketing Management*, 88, pp. 330-338.
27. Paprocki, R. (2020). Postawy względem pandemii COVID-19 Kultura jako sterownik zachowań w warunkach ryzyka i niepewności. *Pomiary Automatyka Robotyka*, No. 4, pp. 41-46, [https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-e24a42de-cfcd-422d-b811-50141334bea9?q=6f806728-be4c-42d8-bdf7-eacf0fc9a8b4\\$3&qt=IN\\_PAGE](https://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-e24a42de-cfcd-422d-b811-50141334bea9?q=6f806728-be4c-42d8-bdf7-eacf0fc9a8b4$3&qt=IN_PAGE), 31.07.2024.
28. Prokopowicz, P., Drzewiecki, S. (2021). *Lider wystarczająco dobry*. Gliwice: Helion.
29. Rapaccini, M., Saccani, N., Kowalkowski, C., Paiola, M., Adrodegari, F. (2020). Navigating disruptive crises through service-led growth: The impact of COVID-19 on Italian manufacturing firms. *Industrial Marketing Management*, 88, pp. 225-237.
30. Sitko-Lutek, A., Skurzyńska-Sikora, U. (2016). Modele biznesu organizacji nowego paradygmatu. *Zeszyty Naukowe. Organizacja i Zarządzanie*, z. 99. Politechnika Śląska, pp. 463-472.
31. Staszekiewicz, M., Klimkiewicz, K., Beck-Krala, E. (2023). Projektowanie i wdrażanie programów ukierunkowanych na dobrostan pracowników w Polsce. In: M. Juchnowicz, H. Kinowska (Eds.), *Zarządzanie kapitałem ludzkim w warunkach niepewności. Wyzwania i implikacje*. Warszawa: PWE, pp. 161-178.
32. Stawasz, E. (2021). Wpływ kryzysu COVID-19 na zachowania mikro- i małych przedsiębiorstw w Polsce – studia przypadków. In: P. Walentynowicz, A. Sałek-Imińska (Eds.), *Zarządzanie i rynek pracy w warunkach pandemii COVID-19* (pp. 11-25). Pelplin: Bernardinum Sp. z o.o.
33. Stiglitz, J.E. (2006). *Globalizacja*. Warszawa: PWN.
34. Talar, S. (2022). Cyfryzacja gospodarki światowej w warunkach pandemii COVID-19. In: M. Dziembała, S. Talar (Eds.), *Zmiany w gospodarce światowej wywołane pandemią COVID-19. Prace Naukowe*. Uniwersytet Ekonomiczny w Katowicach, pp. 107-122, <https://www.sbc.org.pl/dlibra/publication/edition/632073>, 16.08.2026.

35. Villa, D. (2021). *Smart working dla wszystkich. Więcej niż praca zdalna. Poznaj nowy styl pracy. Zbuduj sukces firmy dzięki satysfakcji swoich pracowników*. Warszawa: CeDeWu Sp. z o.o.
36. Walas-Trębacz, J. (2011). Wprowadzenie. In: J. Walas-Trębacz, J. Ziarko, *Podstawy zarządzania kryzysowego, część 2, Zarządzanie kryzysowe w przedsiębiorstwie*. Kraków: Krakowskie Towarzystwo Edukacyjne sp. z o.o. – Oficyna Wydawnicza AFM.
37. Walas-Trębacz, J. (2011). Przedsiębiorstwo w sytuacji kryzysu. In: J. Walas-Trębacz, J. Ziarko, *Podstawy zarządzania kryzysowego, część 2, Zarządzanie kryzysowe w przedsiębiorstwie*. Kraków: Krakowskie Towarzystwo Edukacyjne sp. z o.o. – Oficyna Wydawnicza AFM.
38. Wawak, S. (2015). Model oceny jakości zarządzania. In: T. Borys, P. Rogala, P. Skowron (Eds.), *Zrównoważony rozwój organizacji – odpowiedzialne zarządzanie* (pp. 395-404). Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu.
39. Wierzbicki, S. (2016). *Rola globalizacji we współczesnym świecie. Polityka. Ekonomia. Bezpieczeństwo. Społeczeństwo. Kultura*. Katowice: Sophia.
40. Woźniak, H., Kędzierska-Szczepaniak, A., Szczepaniak, K. (2023). *Globalne łańcuchy wartości. Uwarunkowania rozwoju i funkcjonowania*. Warszawa: Wydawnictwo Nieoczywiste.
41. Zahoor, N., Golgeci, I., Haapanen, L., Ali, I., Arslan, A. (2022). *The role of dynamic capabilities and strategic agility of B2B high-tech small and medium-sized enterprises during COVID-19 pandemic: Exploratory case studies from Finland*. *Industrial Marketing Management*, <https://doi.org/10.1016/j.indmarman.2022.07.006>, 16.08.2024.





## CURRENT STATE OF RESEARCH IN THE FIELD OF DIGITAL BRAND EQUITY

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**Purpose:** In the digital era, the importance of brand and branding is increasing. Therefore, the aim of this study is to determine the current state of development of the research field on digital brand equity (DigBE).

**Design/methodology/approach:** The five steps of a bibliometric analysis were applied, including design, compilation, analysis, visualization, and interpretation. A complex search of the Scopus database yielded 166 publications in total. Science mapping and performance metrics relating to publications and citations were used in analysed studies.

**Findings:** Since 2002, when the first article on HBE was released, 166 publications have been published, with 3,487 citations. The primary categories for these publications were accounting, management, and business. The most associated countries included Portugal, China, India, Australia, and the United States. 859 items were found using keyword analysis, and 13 clusters were identified in the science mapping, for example: digital brand-consumer relationships, digital brand management, the importance of social media for online branding, business determinants, customer satisfaction and loyalty social media marketing activities, or shaping user experience using artificial intelligence.

**Research limitations/implications:** DigBE was analysed in general, indicating digital marketing and social media marketing without indicating specific social media. Secondly, the entire period 2002-2023 was analysed, without identifying sub-periods. Thirdly, the study dealt with brands in general, without pointing product brands, service brands, or other brands, including city brands or tourist destination brands.

**Practical implications:** Recommendations for managers relate to several aspects. Firstly, attention should be paid to the specificity of digital marketing in the context of shaping the brand-consumer relationship. Secondly, managers should monitor the effects of their activities through social media. Thirdly, managers should pay attention to the coherence of the marketing activities carried out and the interdependence of the different channels.

**Originality/value:** This study on DigBE conducted using bibliometric analysis fills a research gap, as there were no studies showing the current state of development of this research area. Clusters depicting current research areas in the field of DigBE were identified, and this constitutes the novelty of this study.

**Keywords:** digital brand equity, digital branding, bibliometric analysis.

**Category of the paper:** literature review.

## 1. Introduction

Digital marketing is an increasingly important research area for marketing in recent times (Naim, Al Ghamdi, 2023; Singh, Kaunert, 2024; Tandur et al., 2024). Research addresses, for example, hyper-personalisation in the context of the use of artificial intelligence and positive consumer experiences for planning effective marketing strategies and actions taken to increase brand loyalty (Singh, Kaunert, 2024). The impact of digital marketing on purchase intentions with the moderating effect of brand equity was also analysed (Alwan, Alshurideh, 2022). Furthermore, the impact of digital marketing on brand building, including brand awareness and development (Yuvaraj, Indumathi, 2018), the effectiveness of e-commerce, social media marketing, and brand-consumer communication (Naim, Al Ghamdi, 2023), and business performance, including the increase of sales and size of consumer groups (Tandur et al., 2024) have been studied.

Brand equity is crucial issue in brand marketing (Almestarihi et al., 2021; De Verma, 2021; Rojas-Lamorena et al., 2022; Dropulić et al., 2022). Empirical studies published in the literature refer to different categories of products (Juga et al., 2018; Morrison, Eastburn, 2006; Tong, Hawley, 2009), services (Hazée et al., 2017; Kimpakorn, Tocquer, 2010), brands, companies, and institutions (Pappu et al., 2005; Tong, Hawley, 2009; Yoo, Donthu, 2001). Retail brands (Çifci et al., 2016; Dwivedi, Merrilees, 2013), place brands (Andéhn et al., 2014; Florek, Kavaratzis, 2014), city brands (Florek, 2012; Gómez et al., 2018; Górska-Warsewicz, 2020), university brands (De Heer, 2020), and green brands (Gupta et al., 2019; Konuk et al., 2015; Vijay MallikRaj et al., 2017) have also been analyzed.

A research gap was identified regarding digital brand equity, although there are studies in the form of bibliometric analysis and systematic literature review in this area. For example, they address brand equity in the digital era and analyze the issue in the context of technology. The search path of ‘brand equity’ and ‘technology’ was used. Key research areas such as product and service innovation, integrated marketing communication, and artificial intelligence were pointed out (Dropulić et al., 2022). Consumer-based brand equity for online brands was also investigated using a systematic literature review combined with bibliometric analysis. The search path used the keywords of ‘brand equity’ and ‘online’. It was shown that such brand equity is linked to online consumer behavior, including communication, engagement, and electronic word-of-mouth, among others. It was indicated that digital brand equity is studied analogously to non-digital brand equity (Enes et al., 2024).

Based on the above considerations, the purpose of this study was to examine the present status of DigBE with the use of bibliometric analysis. Three research questions were developed:

1. How is the knowledge field's growth in DigBE advancing?
2. Which authors, countries, and publication sources stand for the progress of DigBE knowledge?
3. What areas of research topics are being examined in relation to DigBE?

## 2. Literature review

Digital marketing can be defined as the practice of promoting products or services using electronic means (Francis et al., 2023). Utilizing digital media and technologies to advertise goods and services, digital marketing is an essential part of contemporary corporate tactics. It includes a range of strategies and resources meant to interact with customers via digital platforms like social media, email, the internet, and mobile devices (Fernandes, Vidyasagar, 2015; Guarda et al., 2020; Veleva, Tsvetanova, 2020). With a wide range of tools and strategies to efficiently reach and engage customers through a variety of online platforms, digital marketing is a crucial tactic for companies looking to remain competitive (Fernandes, Vidyasagar, 2015; Veleva, Tsvetanova, 2020).

Digital marketing is the process of managing and implementing marketing plans through electronic media, such as websites, emails, interactive television, and wireless media. To customize marketing campaigns and improve consumer relations through mass customization, it uses digital data about client traits and behavior (Fernandes, Vidyasagar, 2015). In this context, digital marketing uses email marketing, search engine optimisation, mobile marketing, and blogging to build and communicate brand positioning. It increases brand awareness in multi-channel brand communication. In this context, digital marketing can be referred to digital branding or digital communication (Yuvaraj, Indumathi, 2018). Digital marketing also uses social media platforms, and content marketing, enabling direct, personalized communication with consumers in real time. This fosters immediate responses to market and customer needs (Baron et al., 2014; Guarda et al., 2020).

Digital marketing is essential for digital branding in relation to consumer interaction, promotion, and brand building. Using several channels, it increases brand exposure and loyalty. These resources assist brands in efficiently communicating their positioning and interacting with customers (Yuvaraj, Indumathi, 2018). In addition, high-impact digital ads, particularly interactive ones, increase likeability and brand connection, which increases virality and retransmission (Baron et al., 2014). This leads to stronger relationships between brands and consumers fostered by the direct and indirect interactions that digital platforms provide. This exchange is essential for increasing brand recognition and loyalty (Aancy et al., 2023).

The issue of brand equity is important in digital branding (AbdGhani et al., 2024). Brand equity has been the subject of numerous studies since the late 1980s (Aaker, 1991; Farquhar, 1989; Keller, 1993). Definitions from 1989-1993 identify brand equity as the value added to a product (Farquhar, 1989), the set of assets and liabilities associated with a brand name (Aaker, 1991), and the consumer response to brand marketing (Keller, 1993). Regarding digital brand equity, social media marketing and other digital branding tactics are crucial for creating solid customer-brand interactions, which in turn greatly increase brand equity. This relationship is essential because it fosters customer loyalty and emotional ties (AbdGhani

et al., 2024). In addition, digital marketing allows brand equity to be managed and influences the growth of small and medium-sized enterprises (Dumitriu et al., 2019). An important element is the issue of trust in shaping digital brands, which is analyzed in the literature through models referring to branding theory and practice (Ozbal et al., 2020).

### 3. Methodology

The purpose of this study was to examine the present status of DigBE with the use of bibliometric analysis. This approach to analysis is becoming more and more common (Donthu et al., 2021; Ellegaard, 2018; Moral-Muñoz et al., 2020). Bibliometric analysis is a method to determine the current condition of the area of study from a historical viewpoint and forecast future development trends (Gan et al., 2022). The methodology used for the bibliometric analysis was Zupic & Čater (2015). Design, compilation, analysis, visualization, and interpretation are the five steps of this bibliometric process (Zupic, Čater, 2015).

Research topics and the study's design were developed in the first stage. The Scopus database provided bibliometric information in the form of 166 publications for the second step. Under time constraints, the search was carried out on September 10, 2024, using the state as of December 31, 2023. The search path employed was as follows: (TITLE-ABS-KEY ("brand equity") AND TITLE-ABS-KEY (digital) AND (PUBYEAR > 2001 < 2024) (LIMIT-TO (LANGUAGE, "English"))).

The data analysis at the third step included science mapping and performance analysis. Indicators pertaining to publications, such as the quantity of publications and lead authors, as well as citations, such as the total number of citations and the average number of citations per year, were employed (Donthu et al., 2021). By source, the bibliometric study looks at the topics covered in DigBE and Scopus publications. Charts showing the quantity of items and clusters are part of the bibliometric counting method of science mapping. The authors with the most publications were determined. The number of clusters was determined by mapping as bibliometric counting of authors of DigBE articles. The countries with the most affiliations are displayed in this study.

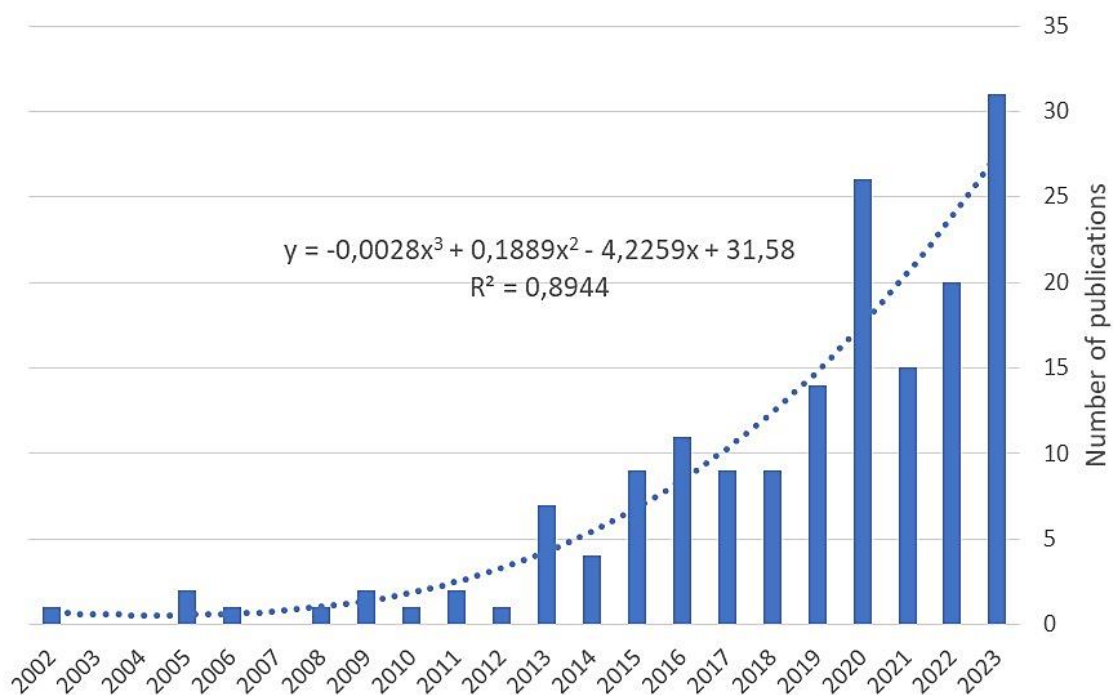
The entire number of keywords and the ranking of the most common terms were revealed via keyword analysis. An examination of co-occurrence was found using mapping techniques. A minimum of five keyword occurrences were covered by a counting approach. To prepare bibliometric counting and co-occurrence analysis, VOSviewer (Nees Jan van Eck and Ludo Waltman, Leiden University, version 1.6.17) was utilized. The discussion section concludes the bibliometric study by providing a summary of the responses to the research questions.

## 4. Results

### 4.1. Number of DigBE publications and citations

There were 166 publications on DigBE at the end of 2023. Eight studies were published between 2002 and 2010, 92 studies between 2011 and 2020, and 66 documents between 2021 and 2023, with an average of 7.5 publications each year (Figure 1).

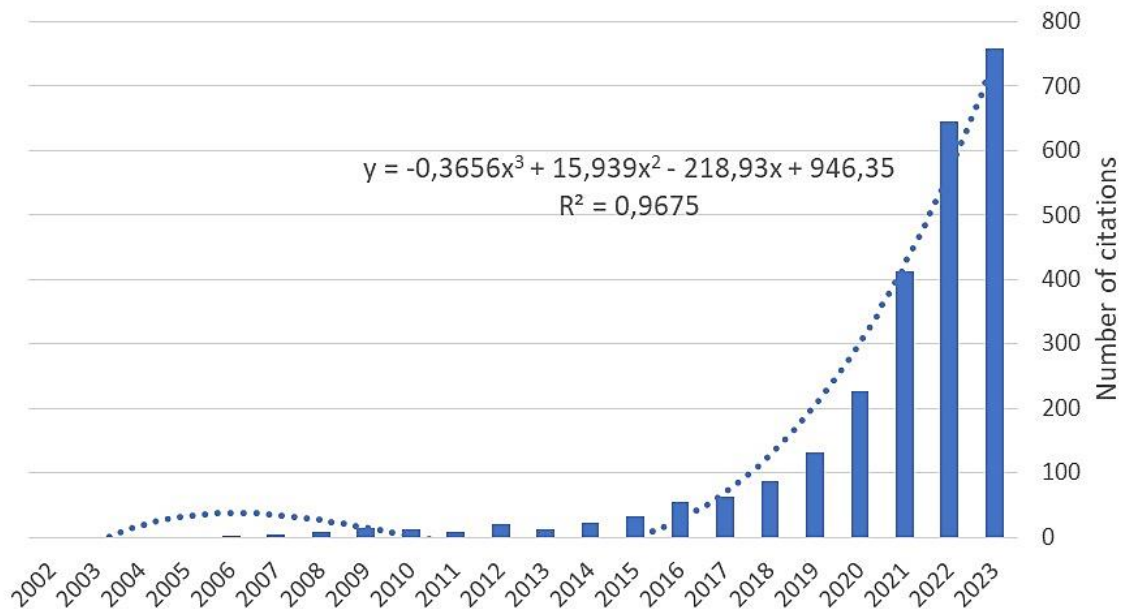
The first publication indexed in the Scopus database is *Proceedings of the International Conference on Information Systems, ICIS 2002* (ICIS 2002 Proceedings, 2002). 93 papers were presented in the conference proceedings, including one paper on determinants of brand equity in e-business. No publication on DigBEs was published for two consecutive years. In contrast, two studies were published in 2005. The first is *An approach to the measurement, analysis, and prediction of brand equity and its sources* in *Management Science* by V. Srinivasan, C.S. Park, and D.R. Chang. A new definition of brand equity was proposed, indicating the incremental contribution in dollars per year achieved by branded products compared to the underlying product (or service) with no brand-building efforts. Three sources of brand equity were analyzed: brand awareness, attribute perception biases, and non-attribute preference in relation to digital phones as a single product category. The second publication was a conference paper *The ability of branded online games to build brand equity: An exploratory study* by D. Deal published in the Proceedings of the DiGRA 2005 Conference. The publication analyzed the importance of advergames, pointing to the brand equity of advergame products.



**Figure 1.** Number of DigBE publications between 2002 and 2023.

Source: Scopus data with trend line, as of 31.12.2023.

The total number of citations of the DigBE studies included in this bibliometric analysis is 3487. The average annual number of citations equals 158.5. Of the 166 DigBE publications, 115 were cited with an h-index of 30. Between 2002 and 2010, the number of citations was 42, and between 2010 and 2020, it was 659 citations. In the 2021-2023 period, the studies received 1818 citations (Figure 2).



**Figure 2.** Number of DigBE citations between 2003 and 2023.

Source: Scopus data with trend line, as of 31.12.2023.

The article *Digital content marketing's role in fostering consumer engagement, trust, and value: framework, fundamental propositions, and implications* published in 2019 in the *Journal of Interactive Marketing* received the highest number of citations (Hollebeek, Macky, 2019). By the end of 2023, this article had received 447 citations, which is almost 80% more than the next publication (Table 1). The article defines digital content marketing as the production and distribution of pertinent, value brand-related material on digital platforms to build positive brand engagement, trust, and relationships with present or potential customers. In addition, the determinants of consumer-based digital content marketing were identified, such as functional, hedonistic, and authenticity-based motivations.

**Table 1.**  
*Most cited DigBE publications*

| No. | Title  | Authors  | Journal  | Year | Number of citations |
|-----|--|--|--|------|---------------------|
| 1.  | Digital content marketing's role in fostering consumer engagement, trust, and value: framework, fundamental propositions, and implications.      | Hollebeek, L.D., Macky, K.   | Journal of Interactive Marketing, 45, pp. 27-41                  | 2019 | 441                 |
| 2.  | Branding in a hyperconnected world: refocusing theories and rethinking boundaries.   | Swaminathan, V., Sorescu, A., Steenkamp, J.-B.E.M., O'Guinn, T.C.G., Schmitt, B. | Journal of Marketing, 84(2), pp. 24-46                           | 2020 | 247                 |
| 3.  | Reflections on customer-based brand equity: perspectives, progress, and priorities.  | Keller, K.L.   | AMS Review, 6(1-2)   | 2016 | 210                 |
| 4.  | Social media and luxury brand management: The case of Burberry.  | Phan, M., Thomas, R., Heine, K.  | Journal of Global Fashion Marketing, 2(4), pp. 213-222           | 2011 | 175                 |
| 5.  | An approach to the measurement, analysis, and prediction of brand equity and its sources.  | Srinivasan, V., Park, C.S., Chang, D.R.  | Management Science, 51(9), pp. 1433-1448                         | 2005 | 170                 |
| 6.  | What makes followers loyal? The role of influencer interactivity in building influencer brand equity   | Jun, S., Yi, J.  | Journal of Product and Brand Management, 29(6), pp. 803-814      | 2020 | 150                 |
| 7.  | Customer information resources advantage, marketing strategy and business performance: A market resources based view.                            | Varadarajan, R.  | Industrial Marketing Management, 89, pp. 89-97                   | 2020 | 146                 |
| 8.  | Social media marketing.  | Saravanakumar, M., SuganthaLakshmi, T.   | Life Science Journal, 9(4), pp. 4444-4451                        | 2012 | 131                 |
| 9.  | Antecedent consumer factors, consequential branding outcomes and measures of online consumer engagement: current research and future directions. | Gomez-Trujillo, A.M., Velez-Ocampo, J., Gonzalez-Perez, M.A.                     | Journal of Research in Interactive Marketing, 14(2), pp. 239-268 | 2020 | 107                 |

Publications with the highest number of citations (above 100).

Source: Scopus data, as of 31.12.2023.

#### 4.2. Subject areas and authors of DigBE publications

*Business, management, and accounting* was the subject area with the greatest number of publications (above 100) (Table 2). The subject areas such as *computer science, social sciences* and *economics, econometrics, and finance* came next with more than 30 articles. Further areas were less important in terms of the number of included publications. These included *engineering, decision sciences, environmental science, arts and humanities, and mathematics*. The remaining subject areas included five or fewer publications.

**Table 2.**  
*Subject areas of DigBE publications*

| Subject areas                        | Frequencies |
|--------------------------------------|-------------|
| Business, management, and accounting | 109         |
| Computer science                     | 36          |
| Social sciences                      | 34          |
| Economics, econometrics, and finance | 34          |
| Engineering                          | 12          |
| Decision sciences                    | 9           |
| Environmental science                | 7           |
| Arts and humanities                  | 7           |
| Mathematics                          | 6           |
| Energy                               | 5           |
| Medicine                             | 4           |
| Agricultural and biological sciences | 3           |

Each publication can be classified in the Scopus database into several subject areas.

Source: Scopus data, as of 31.12.2023.

The authors of the DigBE publications were diverse. This is evidenced by the fact that no author has published more than two studies. Among the authors who published two publications were: Akter S., Branco F., Correia R., Das S., Dias P., Erickson G.S., Gonçalves R., Hollebeek L.D., Martins J., Mironova L., Peltier J., Powell S.M., Puriwat W., Rodrigues S., Rothberg H.N., Swaminathan V., and Vilhena E. The other authors each published one study.

#### 4.3. Countries and sources of DigBE publications

The United States has the greatest group of authors, followed by India (Table 3). There were 10-12 authors or co-authors from Australia, China, and Portugal. Other nations, such as France, Italy, and Germany, had less than ten affiliations.

**Table 3.**  
*Affiliate countries of DigBE publications*

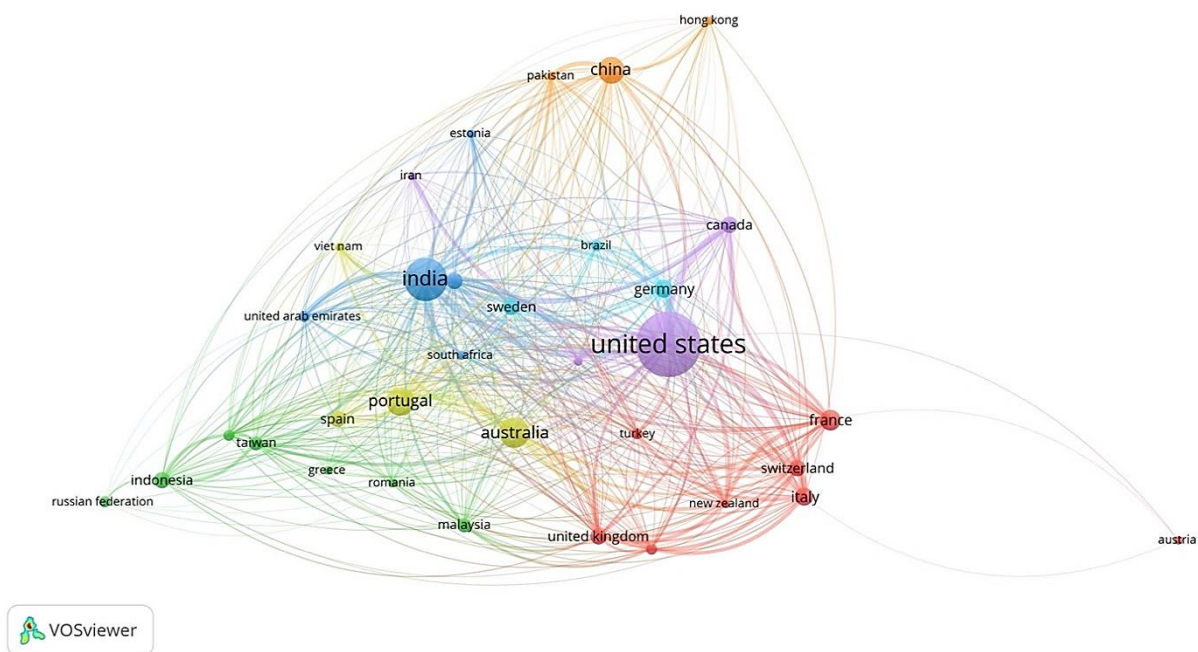
| Countries      | Frequencies |
|----------------|-------------|
| United States  | 36          |
| India          | 20          |
| Australia      | 12          |
| China          | 10          |
| Portugal       | 10          |
| France         | 7           |
| Italy          | 6           |
| Germany        | 6           |
| United Kingdom | 5           |
| Switzerland    | 5           |
| Sweden         | 5           |
| South Korea    | 5           |
| Indonesia      | 5           |
| Canada         | 5           |
| Taiwan         | 4           |
| Malaysia       | 4           |

Table does not include countries that have been affiliated 3 times or less.

Source: Scopus data, as of 31.12.2023.



The bibliographic coupling identified 61 countries. Using the minimum number of documents at level 2, 34 countries were identified in 7 clusters (Figure 3). Eight countries (Austria, France, Hungary, Italy, New Zealand, Switzerland, Turkey, and the United Kingdom) were classified into the first cluster, seven countries (Greece, Indonesia, Malaysia, Romania, Russian Federation, Taiwan, and Thailand) in cluster No. 2, five countries (Estonia, India, South Africa, South Korea, and the United Arab Emirates) in cluster No. 3, four countries (Australia, Portugal, Spain, and the United States) in clusters No. 4, four countries (Albania, Canada, Iran, and the United States) in cluster No. 5, three countries (Brazil, Germany, and Sweden) in cluster No. 6, and three countries (China, Hong Kong, and Pakistan) in cluster No. 7.



**Figure 3.** Bibliometric coupling of countries for DigBE publications.

Source: VOSviewer based on Scopus data, as of 31.12.2023.

Publications on DigBE were mainly published as articles in journals (103 documents) and publications in conference proceedings (30). Other publications appeared as book series (21), books (15), and articles in trade journals (1).

In terms of the number of publications, the most numerous were Developments in Marketing Science Proceedings of the Academy of Marketing Science (10 documents), Springer Proceedings in Business and Economics (5), and Conference Proceedings of 19<sup>th</sup> Americas Conference on Information Systems AMCIS 2013 “Hyperconnected World Anything Anywhere Anytime” (5). Four publications each appeared in Sustainability and AMS Review, and three publications each were published in Proceedings of the European Conference on Knowledge Management, Management for Professionals, Lecture Notes in Computer Science, Journal of Research in Interactive Marketing, Journal of Global Fashion Marketing, Journal of Business Research, Journal of Brand Management, International Journal of Internet Marketing and Advertising, Frontiers in Psychology, and European Journal of Marketing.

#### 4.4. Thematic areas of DigBE publications

The DigBE-related publications indexed in the Scopus database provided 859 keywords. *Brand equity* was the most used term (Table 4). Other keywords such as *social media*, *marketing*, *digital marketing*, and *branding* were far less common. The keywords *sales* and *brand loyalty* appeared in 9 publications. Eight studies featured the keyword *brand image* and seven documents featured keywords such as *social media marketing*, *purchase intention*, and *consumer behaviour*.

**Table 4.**

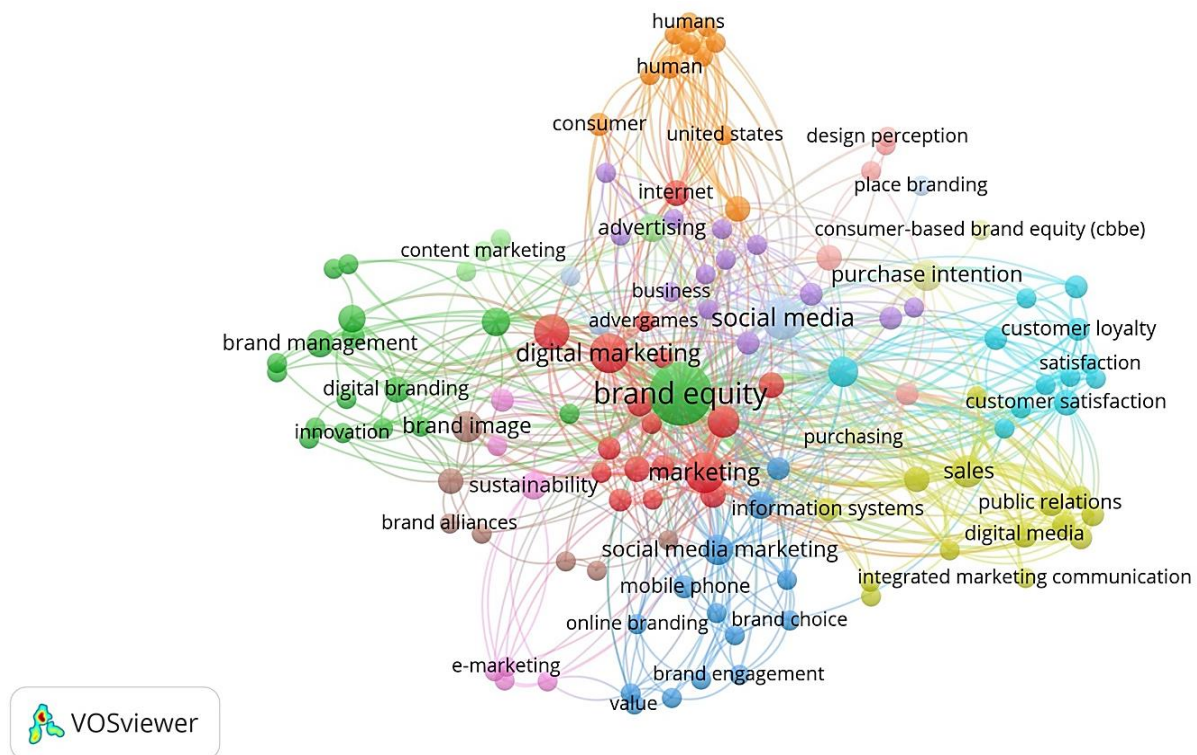
*The most frequently occurring keywords in DigBE publications*

| Keywords                    | Frequencies |
|-----------------------------|-------------|
| Brand equity                | 79          |
| Social media                | 22          |
| Marketing                   | 19          |
| Digital marketing           | 17          |
| Branding                    | 12          |
| Sales                       | 9           |
| Brand loyalty               | 9           |
| Brand image                 | 8           |
| Social media marketing      | 7           |
| Purchase intention          | 7           |
| Consumer behaviour          | 7           |
| Brand experience            | 6           |
| Advertising                 | 6           |
| Sustainability              | 5           |
| Electronic commerce         | 5           |
| Customer-based brand equity | 5           |
| Brand management            | 5           |

Table does not include keywords that have been mentioned 4 times or less.

Source: Scopus data, as of 31.12.2023.

Analysis of keyword co-occurrence using the full counting method with minimum number of occurrences of a keyword at the level of two identified 13 clusters (Figure 4).



**Figure 4.** Keyword co-occurrence presentation using bibliometric mapping of DigBE publications.

Source: VOSviewer based on Scopus data, as of 31.12.2023.

Cluster No. 1 can be defined as “Building brand-consumer relationships in the context of the internet and digital marketing”. The cluster contains 17 keywords, examples being *brand trust*, *consumer-based brand equity*, *consumer-brand relationships*, *digital marketing*, *internet marketing*, *interactivity*, *brand value*, and *authenticity*. Shaping consumer-brand relationships is related to taking into account the authenticity and loyalty of the consumers and seeking to build trust and brand value based on the consumer experience. In this aspect, digital and internet marketing for shaping brand trust and brand value are taken into account. The analysis of consumer behavior provides information to personalize experiences and undertake online marketing. In addition, important interactivity is achieved through communication. Advergaming and engagement campaigns are included to increase engagement and strengthen the consumer-brand relationship.

Cluster No. 2 can be named “Brand management in the digital age with brand identity, including corporate branding”. The cluster contains 17 keywords, including *brand equity*, *brand experience*, *brand identity*, *brand management*, *corporate branding*, *customer engagement*, *customer-based brand equity*, *digital age*, *digital branding*, *integrated marketing communication*, *innovation*, *luxury brand*, and *luxury branding*. The publications included in this cluster analyzed the issue of building brand value and identity through consistent customer experience, innovation, and customer engagement. Customer engagement with the brand is realized through integrated marketing communication using digital and traditional channels in the media management process. The issues of brand identity and brand experience are particularly relevant for luxury brands and luxury branding.

Cluster No. 3 can be described as “The importance of social media for online branding, brand engagement and brand choice”. The cluster contains 14 keywords, for example *brand choice, brand engagement, online branding, social media advertising, social media marketing, social networks, social networking sites, and value*. Marketing communication carried out on social media centers around online branding. The aim is to drive dialogue with consumers, which is important for understanding consumer preferences. This allows for a personalized experience and consequently shapes brand engagement and leads to brand choice. The value to the consumer offered by the brand determines retention and builds loyalty. This occurs through properly planned social media advertising.

Cluster No. 4 is entitled “Shaping customer relationships with modern technologies, knowledge, information, and intellectual capital management processes”. The cluster contains 14 keywords, including *customer relationships, digital media, digital storage, information management, intangible assets, information systems, integrated marketing, communication, intellectual capital, knowledge management, product development, public relations and relational capital*. The themes of the publications in this cluster point to the imperative of using knowledge and information resources and the right process of managing them to create lasting relationships with customers. To this end, digital media and information systems are used to shape relational capital. Intellectual capital and intangible assets enable product development. At the same time, information systems support information and knowledge management. This influences the quality of customer service, shapes the right relationships, and determines consumer satisfaction. In this aspect, integrated marketing communication, including public relations allows for effective management of intangible assets.

Cluster No. 5 can be described as “Business determinants in the digital age”. This cluster contains 13 keywords, including *business consumption, digital behavior, content marketing, perceived quality, engagement, small and medium-sized enterprise, strategic approach, and technology adoption*. The topics of the publication point to a business perspective with a strategic approach, technology adoption. This applies to a variety of businesses, and in this cluster, attention is given to factors that enhance the competitive position of small and medium-sized enterprises. The issue of perceived quality as an important determinant of consumer choice decisions was also analyzed. This determines the competitiveness and sustainability of enterprises.

Cluster No. 6 can be described as “Customer satisfaction and loyalty social media marketing activities”. The cluster contains 12 keywords, including: *customer satisfaction, customer loyalty, e-wom, satisfaction, loyalty, consumer behavior, brand, trust, and social media marketing activities*. The publications point out that an important element in shaping successful brands is building consumer trust, which leads to increased consumer satisfaction and determines consumer loyalty. Marketing communication activities influence the generation of positive experiences, which is reflected in e-wom.

Cluster No. 7 can be titled “Consumer behavior with gender differences and cross-cultural factors”. The cluster included 11 keywords such as *consumer*, *young adult*, *male*, *female*, *controlled study*, and *young adult*. The impact of gender on consumer behavior was analyzed using a variety of methods, for example a controlled study, as well as different techniques, such as factor analysis. At the same time, the influence of cultural factors related to national culture was noted.

Cluster No 8 can be described as “Foundations of brand strategy in the context of consumer engagement”. This cluster contains 7 keywords, including *brand alliances*, *brand awareness*, *brand extension*, *brand image*, *brand meaning*, *brand personality*, and *consumer engagement*. The publications analyzed brand alliances understood as different forms of cooperation and collaboration between brands to increase the value of the market offer, to improve the image, and to increase brand awareness and market share. Brand awareness was studied as an element of brand equity important for the formation of associations with the brand, its characteristics, attributes, and values. In some publications, brand awareness was combined with image understood through the prism of how brands are perceived. Brand personality was also analyzed in relation to various characteristics and attributes that influence the specific nature of the perceived brand. The importance of the brand in consumer purchasing decisions, in shaping the consumer-brand relationship, and in companies’ decisions, e.g., in the context of brand extensions, was also pointed out as important factor for the introduction of new or modified products. In this context, branding newly introduced products with the same brand allows the use of a familiar image and facilitates the building of trust.

Cluster No. 9 can be described as “E-marketing in tourism”. It contains 7 keywords such as *corporate reputation*, *e-marketing*, *intention to visit*, *rural tourism*, *sustainability*, and *tourist destination*, among others. The publications analyzed digital marketing tools and strategies for tourism branding and the promotion of tourism services online. In this context, corporate reputation was important, particularly for trust building and gaining positive opinions. The willingness of potential tourists to visit a particular destination or a specific tourism enterprise, e.g., a hotel, is a result of marketing, including e-marketing, and the reputation of a place. Sustainability is important in this aspect, as well as in tourism in terms of minimizing the impact on the environment, the local community, and generating economic benefits.

Subsequent clusters contain 5 words or less. Cluster No. 10 can be described as “Shaping user experience in the digital environment using artificial intelligence”. Keywords include *artificial intelligence*, *design perception*, *social networking (online)*, and *user experience*. It was pointed out that the overall user experience can be optimized using artificial intelligence and data derived from social networks. This maximizes user satisfaction and loyalty. Artificial intelligence also allows for insightful data analysis, personalization of experiences, and automation of processes. This influences user engagement, increases interactions, and determines brand perceptions.

Cluster No. 11 with the four keywords *advertising*, *content marketing*, *marketing strategy*, and *storytelling* can be described as the “Key elements of modern marketing strategy”. Storytelling is important for brands to shape the brand-consumer relationship. This allows lasting and authentic bonds to be built. At the same time, using content marketing and communicating compelling and valuable content increases consumer engagement and builds trust in the brand.

Cluster No. 12 also contains 4 keywords, including *customer experience*, *place branding*, *smes*, and *social media*, among others. It can be defined as “Shaping customer experience in small and medium-sized enterprises in the digital world”. Building customer experience in the digital and real world increases the consumer's interaction with the brand. In small and medium-sized enterprises, due to limited resources, building authentic relationships and customer experience in social media achieves additional importance. This is relevant for place branding and brand development in various manufacturing and service sectors.

Cluster No. 13 contains the 3 keywords *customer-based brand equity*, *purchase intention*, and *purchasing*. It can be defined as “The impact of customer-based brand equity on the purchasing process of consumers and customers”. Publications have analyzed the impact of strong and positive brand equity on purchase intention and actual purchases. Companies with high equity brands achieve greater customer interest, which results in higher sales. This in turn influences long-term loyalty, which determines positive recommendations, subsequent purchase intentions, and increased purchases in terms of quantity and frequency.

## 5. Discussion of results and implications

The aim of this study was to explore the issue of DigBE and to indicate the current state of this research and publication area. The three research questions addressed the current state of knowledge on the topic of DigBE, the identification of key authors, countries, and publication sources, and the identification of thematic areas important for DigBE.

The first question related to determining the degree of growth of the DigBE research area. The first study was published in 2002, and by the end of 2023, 166 studies had been indexed in the Scopus database. The average annual number of publications was 7.5, and the trend line shows further growth. The number of citations of DigBE studies was 3,487 by the end of 2023, with an average annual number of citations of 158.5. There was an upward trend in the number of citations.

The second research question focused on key authors, countries, and sources of DigBE publications. In terms of authors, this theme was fragmented. No author with a dominant number of publications was identified. There were authors or co-authors of a maximum of two publications. There were 17 such authors; the remaining authors published one study.

This demonstrates the thematic diversity of this research area. In terms of authors' countries of affiliation, the United States dominated, followed by India. Still, Australia, China, and Portugal were affiliated with more than 10 publications. The remaining publications were affiliated less frequently. A total of 61 countries were found, and 34 of these formed seven clusters, taking as a criterion the minimum number of documents with a country at level 2. Most publications appeared in Science Proceedings of the Academy of Marketing Science, Springer Proceedings in Business and Economics, and Conference Proceedings of 19<sup>th</sup> Americas Conference on Information Systems, AMCIS 2013 “Hyperconnected World Anything Anywhere Anytime”. This fact indicates the dynamic development of this research topic.

The thematic analysis conducted as a keyword mapping identified 13 clusters. This is a significant number, indicating the thematic diversity of this research area. The themes of the publications were digital marketing and digital age in the context of building brand-consumer relationships, brand management, importance of social media, and business determinants. An interesting research topic was the use of modern technologies in knowledge, information, and intellectual capital management. Attention was also paid to brand identity, including corporate branding, brand engagement, brand experience, and brand choice. Customer satisfaction and loyalty as the results of social media marketing activities were examined. One topic area referred to shaping user experience in the digital environment via artificial intelligence.

This bibliometric analysis on DigBE fills a research gap since it identifies research areas and thematic topics and draws attention to the specificity of the topic in terms of key authors and publication sources. Recommendations for managers relate to several aspects. Firstly, attention should be paid to the specificity of digital marketing in the context of shaping the brand-consumer relationship. Secondly, carrying out marketing activities through social media influences purchase intentions, actual purchase decisions, and brand evaluation. Managers should monitor the effects of their activities in detail. Thirdly, digital marketing activities are shaped by a compilation of methods and channels. Managers should pay attention to the coherence of these activities and the interdependence of the different channels.

## **6. Conclusions, limitations, and future research**

DigBE is an increasingly important issue in digital marketing and marketing in general. There has been an increase in publication intensity, as demonstrated by a quantitative increase in the number of publications and citations. Thematic areas relating to, for example, building brand-consumer relationships, brand management, or identifying business determinants in the context of internet and digital marketing were identified. Also, important as thematic areas were issues related to shaping consumer satisfaction and loyalty, identifying marketing strategy

assumptions, including marketing communication strategies in social media, and shaping user experience via artificial intelligence.

This study also has limitations. Firstly, DigBE was analysed in general, indicating digital marketing and social media marketing without indicating specific social media. Secondly, the entire period 2002-2023 was analysed, without indicating sub-periods. Thirdly, the study dealt with brands in general, without indicating product brands, service brands, or other brands, including city brands or tourist destination brands.

Directions for future research could address the different types of brands and how they are created using digital marketing and social media marketing. It would also be important to conduct a systematic literature review and a critical literature review to study definitions, determinants, and implications of digital brand equity. It would also be interesting to analyse specific brands from the point of view of the effectiveness of DigBE formation on selected social media sites.

## References

1. Aaker, D. (1991). *Managing brand equity: capitalizing on the value of a brand name*. New York: Free Press, p. 224.
2. Aancy, H.M., Bandyapadhyay, M., Taneja, S., Rao, P.V., Srivastava, B. (2023). Identifying the factors influencing digital marketing and brand-consumer relationship. *Risk and Decision Analysis*, Vol. 9, Iss. 1, pp. 19-29. <https://doi.org/10.3233/RDA-231505>
3. AbdGhani, N.H., Adamu, L., Sulaiman, Y. (2024). Consumer Brand Relationship (CBR) in SMM Context: Does It Matter for SMEs e-Brand Equity? In: R.E. Khoury, N. Nasrallah (eds.), *Intelligent Systems, Business and Innovation Research. Studies in Systems, Decision and Control* (pp. 457-467). Cham: Springer, [https://doi.org/10.1007/978-3-031-36895-0\\_36](https://doi.org/10.1007/978-3-031-36895-0_36)
4. Almestarihi, R., Al-Gasawneh, J.A., Al-jabali, S., Gharaibeh, M.K., Odai, E., Nausairat, N. (2021). The impact of social media marketing on brand equity: A systematic review. *Turkish Journal of Computer and Mathematics Education*, Vol. 12, Iss. 6, pp. 4073-4080. <https://doi.org/10.18869/acadpub.aassjournal.5.1.73>
5. Alwan, M., Alshurideh, M.T. (2022). The effect of digital marketing on purchase intention: Moderating effect of brand equity. *International Journal of Data and Network Science*, Vol. 6, Iss. 3, pp. 837-848. <https://doi.org/10.5267/J.IJDNS.2022.2.012>
6. Andéhn, M., Kazeminia, A., Lucarelli, A., Sevin, E. (2014). User-generated place brand equity on Twitter: The dynamics of brand associations in social media. *Place Branding and Public Diplomacy*, Vol. 10, Iss. 2, pp. 132-144. <https://doi.org/10.1057/pb.2014.8>
7. Baron, S.D., Brouwer, C., Garbayo, A. (2014). A Model for Delivering Branding Value



- Through High-Impact Digital Advertising. *Journal of Advertising Research*, Vol. 54, Iss. 3, pp. 286-291. <https://doi.org/10.2501/JAR-54-3-286-291>
8. Çifci, S., Ekinci, Y., Whyatt, G., Japutra, A., Molinillo, S., Siala, H. (2016). A cross validation of Consumer-Based Brand Equity models: Driving customer equity in retail brands. *Journal of Business Research*, Vol. 69, Iss. 9, pp. 3740-3747. <https://doi.org/10.1016/j.jbusres.2015.12.066>
  9. De Heer, F. (2020). Exploring the Understanding of University Brand Equity: Perspectives of Public Relations and Marketing Directors. *IOSR Journal of Business and Management* Vol. 22, Iss. 7, pp. 49-57. <https://doi.org/10.9790/487X-2207034957>
  10. De, T., Verma, A. (2021). Integrating Brand Communication and Brand Equity: a Systematic Review From 2000-2020. *Journal of Content, Community and Communication*, Vol. 13, Iss. 7, pp. 199-214. <https://doi.org/10.31620/JCCC.06.21/17>
  11. Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., Lim, W.M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, Vol. 133, Iss. 3, pp. 285-296. <https://doi.org/10.1016/j.jbusres.2021.04.070>
  12. Dropulić, B., Krupka, Z., Vlašić, G. (2022). Brand Equity in a Digital Age: Systematic Literature Review. *Ekonomika Misao i Praksa*, Vol. 31, Iss. 1, pp. 277-302. <https://doi.org/10.17818/emip/2022/1.13>
  13. Dropulić, B., Krupka, Z., Vlašić, G. (2022). Brand Equity in a Digital Age: Systematic Literature Review. *Ekonomika Misao i Praksa*, Vol. 31, Iss. 1, pp. 277-302. <https://doi.org/10.17818/emip/2022/1.13>
  14. Dumitriu, D., Militaru, G., Deselnicu, D.C., Niculescu, A., Popescu, M.A.M. (2019). A Perspective Over Modern SMEs: Managing Brand Equity, Growth and Sustainability Through Digital Marketing Tools and Techniques. *Sustainability*, Vol. 11, Iss. 7, pp. 1-15. <https://doi.org/10.3390/SU11072111>
  15. Dwivedi, A., Merrilees, B. (2013). Retail brand extensions: Unpacking the link between brand extension attitude and change in parent brand equity. *Australasian Marketing Journal (AMJ)*, Vol. 21, Iss. 2, pp. 75-84. <https://doi.org/https://doi.org/10.1016/j.ausmj.2013.02.001>
  16. Ellegaard, O. (2018). The application of bibliometric analysis: disciplinary and user aspects. *Scientometrics*, Vol. 116, Iss. 1, pp. 181-202. <https://doi.org/10.1007/S11192-018-2765-Z/TABLES/6>
  17. Enes, Y. de S.O., Demo, G., Porto, R.B., Zulato, T.S. (2024). What Is Next for Consumer-Based Brand Equity in Digital Brands? Research Itineraries and New Challenges. *Sustainability*, Vol. 16, Iss. 3, pp. 1-19. <https://doi.org/10.3390/su16135412>
  18. Farquhar, P.H. (1989). Managing Brand Equity. *Marketing Research*, Vol. 30, Iss. August-September, pp. 7-12.
  19. Fernandes, S., Vidyasagar, A. (2015). Digital Marketing and Wordpress. *Indian Journal of Science and Technology*, Vol. 8, Iss. 4, pp. 1-8. <https://doi.org/10.17485/IJST/2015/>

V8IS4/60375

20. Florek, M. (2012). City brand equity as one of the city sustainable development indicator. *Transformations in Business and Economics, Vol. 11, Iss. 2A*, pp. 385-405.
21. Florek, M., Kavartzis, M. (2014). From brand equity to place brand equity and from there to the place brand. *Place Branding and Public Diplomacy, Vol. 10, Iss. 2*, pp. 103-107. <https://doi.org/10.1057/pb.2014.9>
22. Francis, U.O., Haque, R., Rahman, A., Al-Hunaiyyan, A., Al-Ainati, S., Lokman, F.Z.A., Isa, M.B.M. (2023). The Impact of Digital Marketing on Consumer Purchasing Behaviour. *International Journal of Operations and Quantitative Management, Vol. 29, Iss. 2*, pp. 378-405. <https://doi.org/10.46970/2023.29.2.18>
23. Gan, Y. na, Li, D. duo, Robinson, N., Liu, J. ping. (2022). Practical guidance on bibliometric analysis and mapping knowledge domains methodology – A summary. *European Journal of Integrative Medicine, Vol. 56, Iss. 12*, pp. 1-15. <https://doi.org/10.1016/J.EUJIM.2022.102203>
24. Gómez, M., Fernández, A.C., Molina, A., Aranda, E. (2018). City branding in European capitals: An analysis from the visitor perspective. *Journal of Destination Marketing & Management, Vol. 7, Iss. 1*, pp. 190-201. <https://doi.org/10.1016/j.jdmm.2016.11.001>
25. Górską-Warsewicz, H. (2020). Factors determining city brand equity-A systematic literature review. *Sustainability, Vol. 12, Iss. 19*, pp. 1-35. <https://doi.org/10.3390/SU12197858>
26. Guarda, T., Lopes, I., Victor, J.A., Vázquez, E.G. (2020). User Behavior: The Case of Instagram. In: Á. Rocha, J. Reis, M. Peter, Z. Bogdanović (Eds.), *Marketing and Smart Technologies. Smart Innovation, Systems and Technologies* (pp. 38-48). Singapore: Springer, [https://doi.org/10.1007/978-981-15-1564-4\\_5](https://doi.org/10.1007/978-981-15-1564-4_5)
27. Gupta, A., Dash, S., Mishra, A. (2019). Self/other oriented green experiential values: Measurement and impact on hotel-consumer relationship. *International Journal of Hospitality Management, Vol. 83, Iss. June*, pp. 159-168. <https://doi.org/10.1016/j.ijhm.2019.05.010>
28. Hazée, S., Van Vaerenbergh, Y., Armirotto, V. (2017). Co-creating service recovery after service failure: The role of brand equity. *Journal of Business Research, Vol. 74, Iss. May*, pp. 101-109. <https://doi.org/10.1016/j.jbusres.2017.01.014>
29. Hollebeek, L.D., Macky, K. (2019). Digital Content Marketing's Role in Fostering Consumer Engagement, Trust, and Value: Framework, Fundamental Propositions, and Implications. *Journal of Interactive Marketing, Vol. 45, Iss. 1*, pp. 27-41. <https://doi.org/10.1016/j.intmar.2018.07.003>
30. ICIS 2002 Proceedings (2002). *International Conference on Information Systems (ICIS). Association for Information Systems*. <https://aisel.aisnet.org/icis2002/>
31. Juga, J., Juntunen, J., Paananen, M. (2018). Impact of value-adding services on quality, loyalty and brand equity in the brewing industry. *International Journal of Quality and*

- Service Sciences*, Vol. 10, Iss. 1, pp. 61-71. <https://doi.org/10.1108/IJQSS-10-2016-0071>
32. Keller, K.L. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. *Journal of Marketing*, Vol. 57, Iss. 1, pp. 1-33. <https://doi.org/10.2307/1252054>
33. Kimpakorn, N., Tocquer, G. (2010). Service brand equity and employee brand commitment. *Journal of Services Marketing*, Vol. 24, Iss. 5, pp. 378-388. <https://doi.org/10.1108/08876041011060486>
34. Konuk, F.A., Rahman, S.U., Salo, J. (2015). Antecedents of green behavioral intentions: A cross-country study of Turkey, Finland and Pakistan. *International Journal of Consumer Studies*, Vol. 39, Iss. 6, pp. 586-596. <https://doi.org/10.1111/ijcs.12209>
35. Moral-Muñoz, J.A., Herrera-Viedma, E., Santisteban-Espejo, A., Cobo, M.J. (2020). Software tools for conducting bibliometric analysis in science: An up-to-date review. *Profesional de La Información*, Vol. 29, Iss. 1, pp. 1699-2407. <https://doi.org/10.3145/EPI.2020.ENE.03>
36. Morrison, M., Eastburn, M. (2006). A Study of Brand Equity in a Commodity Market. *Australasian Marketing Journal (AMJ)*, Vol. 14, Iss. 1, pp. 62-78. [https://doi.org/https://doi.org/10.1016/S1441-3582\(06\)70053-2](https://doi.org/https://doi.org/10.1016/S1441-3582(06)70053-2)
37. Naim, A., Al Ghamdi, K. (2023). Understanding Digital Marketing: An Exemplary Approach. In: A. Naim, A. Devi (Eds.), *Global Applications of the Internet of Things in Digital Marketing* (pp. 94-122). IGI Global. <https://doi.org/10.4018/978-1-6684-8166-0.CH006>
38. Ozbal, O., Duman, T., Topaloglu, O. (2020). A trust-based peer-to-peer digital brand equity (P2P-DBE) model. *Journal of Marketing Theory and Practice*, Vol. 28, Iss. 4, pp. 497-520. <https://doi.org/10.1080/10696679.2020.1794901>
39. Pappu, R., Cooksey, R.W., Quester, P.G. (2005). Consumer-based brand equity: improving the measurement – empirical evidence. *Journal of Product & Brand Management*, Vol. 14, Iss. 3, pp. 143-154. <https://doi.org/10.1108/10610420510601012>
40. Rojas-Lamoren, Á.J., Del Barrio-García, S., Alcántara-Pilar, J.M. (2022). A review of three decades of academic research on brand equity: A bibliometric approach using co-word analysis and bibliographic coupling. *Journal of Business Research*, Vol. 139, Iss. February, pp. 1067-1083. <https://doi.org/10.1016/j.jbusres.2021.10.025>
41. Singh, B., Kaunert, C. (2024). Future of Digital Marketing: Hyper-Personalized Customer Dynamic Experience with AI-Based Predictive Models. In: A. Khang, P.K. Dutta, S. Gupta, N. Ayedee, S. Chatterjee (Eds.), *Revolutionizing the AI-Digital Landscape: A Guide to Sustainable Emerging Technologies for Marketing Professionals* (pp. 189-208). Routledge: New York.
42. Tandur, S., Garg, A., Rahman, M. (2024). Influence Of Digital Marketing Adoption To Leverage Digital Footfall And Enhanced Sales. *Advanced Series in Management*, Vol. 34, Iss. B, pp. 137-152. <https://doi.org/10.1108/S1877-63612024000034B011/FULL/XML>
43. Tong, X., Hawley, J.M. (2009). Measuring customer-based brand equity: Empirical

- evidence from the sportswear market in China. *Journal of Product and Brand Management*, Vol. 18, Iss. 4, pp. 262-271. <https://doi.org/10.1108/10610420910972783>
44. Veleva, S.S., Tsvetanova, A.I. (2020). Characteristics of the digital marketing advantages and disadvantages. *IOP Conference Series: Materials Science and Engineering*, Vol. 940, Iss. 1, pp. 1-8. <https://doi.org/10.1088/1757-899X/940/1/012065>
  45. Vijay MallikRaj, S., Karthikeyan, M.R., Sekar, P.C. (2017). Antecedents of Green Brand Equity: an Empirical Approach. *Asia Pacific Journal of Research*, Vol. 1, Iss. 6, pp. 98-102.
  46. Yoo, B., Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research*, Vol. 52, Iss. 1, pp. 1-14. [https://doi.org/10.1016/S0148-2963\(99\)00098-3](https://doi.org/10.1016/S0148-2963(99)00098-3)
  47. Yuvaraj, S., Indumathi, R. (2018). Influence of digital marketing on brand building. *International Journal of Mechanical Engineering and Technology*, Vol. 9, Iss. 7, pp. 235-243. <https://doi.org/10.55041/ijmsrem12755>
  48. Zupic, I., Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, Vol. 18, Iss. 3, pp. 429-472. <https://doi.org/10.1177/1094428114562629>

## LEADERS DEVELOPMENT IN COMPANIES APPLYING LEAN MANAGEMENT

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**Purpose:** The purpose of the article is to identify and evaluate the activities undertaken in the surveyed companies in the area of leadership development to support the concept of lean management.

**Design/methodology/approach:** The article presents the results of qualitative research in the form of a case study using the interview technique. The research was conducted in two manufacturing companies applying concept of lean management. The scope of the research covered activities undertaken in the companies in the area of leadership development.

**Findings:** The research results show that, in the surveyed companies, activities undertaken in the area of leadership development are implemented both within the structural solutions (e.g. Leadership Academy), training (formal and informal), as well as within the cooperation and exchange of experiences between employees. Support and example from superiors are also crucial. The research results also indicate the need for greater cooperation between various entities in the area of leadership development for the lean management concept.

**Research limitations/implications:** The research conducted is a pilot study. Limiting the research to two case studies results in limitations in the scope of generalizability of conclusions. There is a need to conduct further research in this area on a larger group of companies, taking into account the type of activity and industry.

**Practical implications:** Companies following the lean concept need to develop leaders at all levels of management. This requires the introduction of systemic solutions and embedding in the organizational culture. In addition to structural solutions in the scope of training activities, the inclusion of various entities and their cooperation for the development of lean leadership is important.

**Originality/value:** The research conducted presents a view of the issue under study from the perspective of the various actors involved in leadership development.

**Keywords:** lean management, lean leadership, leaders development.

**Category of the paper:** Research paper.

## 1. Introduction

The concept of lean management (LM), initiated in Toyota in the Toyota Production System (TPS) formula, has become a significant source of creating competitive advantage and improving performance through higher quality offerings (Agyabeng-Mensah et al., 2020). LM is one of the key approaches adopted by several leading companies in the world to create and maintain their competitive position (Losonci, Demeter, 2013). Lean practices have a significant and positive relationship with organizational performance, including operational, financial, market and environmental performance (Antony et al., 2021). The companies' approach to LM has evolved from focusing primarily on “lean” production (to reduce waste, improve operational efficiency and product quality) to embracing lean thinking throughout the organization and creating elaborate management systems based on continuous improvement (CI) (Japanese: kaizen). The concept of lean is a philosophy that enables the creation of a culture focused on continuous improvement, leadership and learning allowing the expansion of its ideas throughout the organization (Santos et al., 2024). It takes a long way to achieve the benefits of the lean philosophy, and there are many critical factors for the success of a lean implementation, one of them is leadership, which plays an essential role in the transition from the previous state to the culture of lean (van Beers et al., 2022).

In addition to being a key implementation factor, lean leadership also plays a key role in maintaining the lean philosophy (Alnadi, McLaughlin, 2021). Lean leadership is a social process, carried out by leaders with personal attributes aligned with lean principles in order to sustain continuous improvement. These leaders should be supported by a lean management system compatible with the internal and external context of the firm (Seidel et al., 2019). There are five main tasks of a lean leader (Seidel et al., 2017): regular communication, structured problem-solving, process confirmation, continuous improvement and employee development. Ensuring leadership in an organization requires taking appropriate development actions and educating people to act as lean leaders. Therefore, the development of leaders and leadership for the effective implementation of lean management assumptions and principles is necessary.

Theoretical and empirical research focuses more on the principles of effective implementation of lean leadership, the role of leadership, or the abilities and competencies required of leaders responsible for implementing and executing lean (e.g. Dombrowski, Mielke, 2013; Holmemo et al., 2023; Seidel et al., 2017; Simões et al., 2024; Toledo et al., 2019) than on the way of leaders development itself. Holmemo et al. (2023) suggest that organizations should build a continuous development capability within their structures, where leadership development is approached holistically, both building personal and interpersonal skills, as well as improving management structures and practices to align with lean thinking. As Moldoveanu and Narayandas (2019) point out, the need for leadership development has never been more

urgent. Companies are realizing that to survive in today's business environment, they need leadership skills and organizational abilities that are different from those that have helped them succeed in the past. There is also a growing awareness that leadership development should not be limited to senior management. This allows to identify a research gap relating to the practices undertaken by companies in the development of lean leaders.

The purpose of the article is to identify and evaluate the activities undertaken in the surveyed companies in the area of leadership development to support the concept of lean management. In order to achieve the adopted purpose, the following research questions were posed: What actions do the surveyed entities take to develop leaders? How do they assess the effectiveness of their actions in the area of leadership development and what problems do they see related to this? What do they expect from organizations to be able to better support leaders in their development?

To obtain answers to the research questions formulated in this way, qualitative research was conducted (based on a case study) using the interview technique. Interviews were conducted with production directors, HR managers and kaizen managers from two manufacturing companies selected for the study. This research should be seen as a pilot study.

The article consists of the following parts: introduction, theoretical background, research methodology and characteristics of the surveyed enterprises, presentation of research results and conclusions.

## **2. Theoretical background**

As mentioned in the introduction, lean leadership is recognised as one of the key success factors when adopting and applying lean management (e.g., Arnaiz et al., 2022; Dombrowski, Mielke, 2013; Holmemo et al., 2023; Oon et al., 2021; Tortorella et al., 2021; Walentynowicz, 2013). The introduction and practice of the lean concept, apart from having typical leadership competencies, also requires competencies that take into account the lean context.

Lean leadership consists of a set of competencies, practices and associated leadership behaviours that enable the implementation and execution of lean concepts (Liker, Convis, 2012). The implementation of lean management changes roles for leaders. The focus in managerial tasks changed from managing processes to managing people. The managers focuses on empowering employees to take control of their work process and involve them in improvement activities. The means and methods to achieve higher employee empowerment, two-way communication flow, and building a system of continuous improvement (Poksinska et al., 2013). Lean leadership is important at all levels of organizational management, but the actions taken should be adapted to the specifics of hierarchical levels (Connor, Cormican, 2021). Netland et al. (2020) emphasize that the roles and responsibilities of lean

managers vary depending on the hierarchical level, and that many difficulties in implementing lean arise when organizations apply the same leadership practices at different levels of the hierarchy.

There is a growing interest in the literature (e.g. Dombrowski, Mielke, 2013; Liker, Convis, 2012; Seidel et al., 2017) regarding determining which leadership behaviors are more in line with the concept of lean. Lists of desired lean leadership competencies and practices are created (e.g. Dombrowski, Mielke, 2013; Seidel et al., 2017; Simões et al., 2024). For example, Seidel et al. (2017) developed a list of sixteen lean leadership competences on the basis of their literature research, which included, among others, the following competences: identify what adds value to internal and external clients, identify and solve problems with their teams using the PDCA principle (coaching), use continuously lean practices and principles, manage with emphasis on value flow rather than on isolated operations, see the problems with your own eyes (based on data and facts), lead through example, stabilize processes, practice self-development as well as professional and personal continuous evolution, develop actions based on long-term views, develop innovative and challenging actions. Simões et al. (2024), on the other hand, presented a list of eighteen essential lean leadership competencies grouped into the following areas: cognitive skills, social capacities, motivational orientation, expertise, knowledge.

Despite the fact that leadership is consistently recognised as an important success factor for the implementation and execution of lean, knowledge on how to develop the necessary leadership competencies at the individual level as well as at the organizational level remains limited (Holmemo et al., 2023). In accordance with the principle of continuous improvement, the competencies of lean leaders should be constantly improved, therefore, it is required to undertake development activities in this area. Two terms are used in the literature: leaders development and leadership development. Leadership development is related to human capital, while leaders development refers to the social capital of the organization (Day et al., 2021). Leaders development refers to the development of individual knowledge, skills, abilities related to the leadership role, which represents an investment in the human capital of the organization. Leadership development, on the other hand, refers to an organization's social resources, which are rooted in work relationships, taking the form of social capital. Holmemo et al. (2023) emphasize in their study that the development of lean leadership in an organization requires actions in these two dimensions. First, in the individual dimension related to competencies, leaders should learn both lean principles and general leadership competencies. Second, in the organizational dimension, individual development should be complemented by planes of collective alignment and actions aimed at eliminating structural and cultural barriers to lean. Holmemo et al. (2023) suggest that lean leadership development should integrate knowledge and practices from human resource management for individual development and knowledge from change management for organizational development.



One of the basic models of lean leadership development is the Toyota model (Liker, Convis, 2012). This model includes the following four practices: (1) commit to self-development, (2) coach and develop others, (3) support daily kaizen, (4) create vision and align goals. The model is based on four values: challenge, kaizen mind, go and see, teamwork, respect for humanity. The literature on the subject also includes more detailed models regarding how lean leadership activities should be implemented at different levels of the hierarchy (Netland et al., 2020) or at different stages of the company's transformation process in the spirit of lean (Holmemo et al., 2018).

Lacerenza et al. (2017) indicate that in practice, organizations seem to rely on conventional leadership development, which, despite its usefulness, may not be sufficiently adapted to the needs of lean. Organizations use various development methods in their leaders development activities (e.g. Allen, Hartman, 2008; Ardichvili et al., 2016; Lacerenza et al., 2017), which have both advantages and disadvantages depending on the context of their application, and each of these methods has its place and time in the overall leadership development process. Campbell et al. (2003) divided the methods used in leadership development activities into three groups: support (providing motivation and belief in the possibility of development), challenge (providing new experiences, skills), assessment (providing information about strengths, weaknesses, and development needs).

### **3. Research methodology and characteristics of the surveyed enterprises**

In order to achieve the aim of the article, own research was conducted using the structured interview technique. Production directors, kaizen managers, HR managers or HR Business Partners (HRBP) and shift managers were selected for the interviews. Such a selection of respondents was to allow for getting to know the perspective of various entities, which is related to the fact that, in accordance with the lean concept, the development of leaders should be implemented at all levels and areas of the company's operations.

Two manufacturing companies with a long history of employing lean management were selected for the study. The respondents requested anonymity, so for the purposes of the study, they were named Company A and Company B:

- Company A is a company with foreign capital operating in the automotive industry, established in the 1950s. It employs about 1500 people and has been implementing Lean Management for over 20 years.
- Company B is a company with foreign capital operating in the food industry, it currently employs about 400 people. Its first production plant was established in the 1940s. It has been implementing Lean Management for 13 years.

Limiting the research to two case studies resulted in limitations in the possibility of generalizing conclusions. At the same time, during the interviews, it was not possible to conduct interviews with all entities selected for the study. In company B, no interview was conducted with the HR manager, because the HR department focuses on the implementation of "hard" HR and does not support the implementation of lean activities. In company A, no interview was conducted with the shift manager due to lack of time related to the implementation of a large contract. The research was a pilot and was conducted in June and July 2024.

## 4. Research Results

### 4.1. Company A

#### 4.1.1. *Actions taken in the area of leaders development*

For the production director, one of the ways to identify potential leaders is through kaizen workshops. Employees who demonstrate activity during these workshops and show potential for development take on the role of team leaders and later advance to managerial positions. Their development path begins at kaizen workshops, which are somewhat like a "breeding ground for leadership talents." The workshop format allows for direct interaction between participants, making it relatively easy to identify potential leaders, and participants can demonstrate their leadership skills. Another possibility are audits conducted in production areas, which aim not only at ongoing improvement and raising employee awareness of the need for continuous improvement but also at identifying leaders through observation and direct interactions with the evaluated employees. The respondent added that he also tries to set an example of how to be a lean leader.

The kaizen manager also stated that he identifies candidates for leaders during the kaizen workshops he organizes and leads. Another opportunity to identify potential leaders is through meetings and conversations with employees on the production lines. The respondent also conducts informal leadership training for managers based on the processes they participate in. During such training, he explains how they can influence their employees "to motivate them to continuous improvement".

The HRBP replied that currently, the company is starting leadership training organized by the HR department and overseen by him in the newly established Leadership Attitudes Academy. Dedicated trainers in the Academy conduct the program of four lean leadership principles in the form of workshops, namely: "inspiring change, leading by example, reinforcing responsibility, mutual trust". Applying these principles by leaders is intended to support the organization in operating in line with the "lean spirit". The HRBP participates in each of these workshops. Participation in the Academy ends with a meeting led by the HRBP,

where participants share examples and experiences from the workshops. Formal oversight of this program will soon be entrusted to the respondent. The respondent explained that the "Leadership Attitudes Development Program" consists of three parts dedicated to different management levels. The most intensive program, intended for the highest management level and lasting a full year, is combined with one-on-one coaching. It is assumed that "leadership is built from the top and then cascades down to lower levels". The second and third levels of training, prepared respectively for middle and lower management levels, are shorter, with the cycle of meetings completed within a month. The aim of the Academy is to teach managers at all management levels the four leadership principles adopted in the company and to show how to implement them in practice to support the lean approach.

#### *4.1.2. Evaluation of actions taken by the examined entities*

The respondents evaluated the effectiveness of their actions on a scale of 1-5, where 1 indicated low effectiveness and 5 high effectiveness. The production director rated the effectiveness of his actions at 4, justifying this rating by the fact that the identified leaders conduct independent kaizen or problem-solving workshops, during which their leadership skills and competencies are utilized and further developed. In his opinion, the main problem, given the strong hierarchical culture in the examined company, is the limited "freedom of movement" and decision-making at lower management levels. High variability of conditions (both external and internal) causes frequent changes in priorities, resulting in high variability of decisions. "This undermines the authority of manager-leaders and their credibility in implementing continuous improvement".

The kaizen manager rated his actions at 3. This rating is due to the fact that the respondent also has other tasks to perform and cannot engage in leadership development as much as he would like. The biggest problem he reported is insufficient cooperation, and often lack thereof, with managers of other departments regarding joint agreements on leadership development for the implementation of lean. This is mostly due to a lack of time, "as there are other tasks with higher priority".

The HRBP rated the effectiveness of his actions at 4. According to the respondent, managers have a strong desire to develop in the area of lean leadership. What hinders this is "the overload of duties and current matters, and the fact that the hierarchy in the examined company is very developed". According to the respondent, it is evident that leadership training significantly influences the attitudes and behaviors of managers at various levels, including the company director, who also receives training in this area. However, the respondent expressed concern that "current matters, the overload of external stimuli, and the need to meet all the goals imposed by the corporation and the internal ones may cause the new leadership principles, which are supposed to support the implementation of LM, to become less important in daily life".

#### *4.1.3. Expectations for obtaining support in the development of leaders*

The production director highlighted the need for the following actions: delegation of authority, decentralization, and increased autonomy – such actions should influence the development of leadership skills at lower management levels. The idea is for new, "young" leaders to feel that "they have their matters in their own hands". The interviewee also stated that greater autonomy and the ability to make fact-based decisions would help managers be perceived as effective leaders.

The kaizen manager expects greater involvement from managers of various departments in leadership development. According to the respondent, they need to understand the importance of leadership for the effective implementation of LM and shape this leadership in their own teams. The interviewee stated that "the kaizen department alone cannot do everything and pull everyone along"; "I also have limited time".

The HRBP expects top-level managers to "support the building of a lean leadership culture, promote a leadership culture among their teams, and not oppose it". In most cases, according to the respondent, this is unfortunately not the case. The respondent believes that it is important to "inspire employees to act for LM by the example set by their supervisor". However, it happens that despite knowing the lean leadership principles in the company, some managers do not follow them - "they declare cooperation, but in practice it is not visible".

## **4.2. Company B**

#### *4.2.1. Actions taken in the area of leaders development*

The first action mentioned by the production director was leading by example as a lean leader. The respondent strives to be present on the production floor daily, talking with employees and supporting them in implementing lean principles. The director often asks employees questions like: "What could you improve, how can it be improved, how do you see the development of your team?" The respondent believes that "employees need to know that leaders are with them, supporting them, so the principle that the example comes from the top should be applied". Additionally, the company is supporting the development of managers at various levels by providing them with training in both "hard" and "soft" HR activities. Another tool supported by the director is providing mentoring for individuals with leadership potential. For example, a foreman becomes a deputy plant manager, but often not of their own plant but another – "The idea is for the employee to show their capabilities and to see how another leader manages, to learn a different management perspective". The respondent also uses internal and external benchmarking, during which good leadership practices are shared.

The kaizen manager listed the following actions: daily presence on the production floor, communication with leaders, and supporting them in organizing and implementing teamwork. Sometimes a leader in a certain area performs better than others; in such cases, the CI manager organizes benchmarking meetings where "leaders learn from each other how to be effective

leaders". The respondent noted: "When shift managers feel they have support, they can later mobilize their people for continuous improvement". According to the respondent: "It cascades, meaning the example comes from the top, and the strength from the bottom". The respondent believes that "the most important thing is the sense of being a team and that we work together for a common success". Currently, the kaizen manager, together with the production director and the HR manager, is co-creating an internal Leader Academy. Since the HR department has not previously supported the implementation of LM and is only now getting involved, the main burden of creating the Leader Academy falls on the kaizen manager. The Leader Academy is expected to be a "breeding ground for leaders".

The shift manager stated that candidates for lean leaders are "picked up" by him during internal recruitment, usually when someone leaves or changes position. "You see such people, e.g., operators with the necessary predispositions and experience, and they are captured. We don't want to lose those people; we want to retain them with the possibility of promotion and development. We offer them support in the new position". The selected person undergoes internal training in areas such as reporting and using IT solutions, conducted by the shift manager. The candidate is then directed to the Leader Academy to develop their leadership competencies for lean implementation.

#### *4.2.2. Evaluation of actions taken by the examined entities*

The production director rated the effectiveness of his actions at 4. He believes that his leadership style is close to the Japanese style. "If you set a good example, lower-level managers learn this leadership from the top". The respondent criticizes himself for rarely giving feedback to his employees in the form of praise or constructive criticism and equally rarely receiving feedback from them. He believes that these skills need to be further developed in everyone. "Everyone should exchange information, both positive and negative, because it is the basis of continuous improvement".

The kaizen manager rated the effectiveness of his actions at 3. He believes that "things have been good for some time, but there is still much to be done in the area of lean leadership development". The biggest problem, according to the respondent, is "the lack of cooperation between different entities, the lack of decisive support from the HR department, and the still weak systemic approach to leadership development for the needs of Lean Management".

The shift manager rated the effectiveness of his actions at 3. He explained that this rating is not due to his reluctance to support leaders but to the substantial number of various duties and tasks he has. "Initially, there is more support and involvement in leadership development, but later it often starts to wane because there are various current matters to attend to, and time is usually scarce". "There is also a lack of greater support from the HR department, e.g., in organizing training for new leaders". "As a result, these young leaders are often thrown into the deep water and sometimes left to fend for themselves". "Now that the Leader Academy has been established, the situation should improve".

#### 4.2.3. *Expectations for obtaining support in the development of leaders*

The production director hopes for greater support from the HR department in the form of, for example, training for leaders in "soft" skills. He expects the kaizen manager to develop the Leader Academy. He also hopes for "greater emphasis on the lean approach in daily activities and more frequent organization of leadership development training".

The kaizen manager has high hopes for the newly launched Leader Academy. He also expects support from direct supervisors in the development of leaders in their teams. According to the respondent, direct supervisors should act as mentors, be an authority for employees, and a model of how to be a lean leader.

The shift manager hopes for support from his direct supervisor. "Giving a sense of support, talking, asking how things are going? It gives him strength and motivation to continue working, which is very important in continuous improvement". He also hopes for leadership training organized by the HR department. According to the respondent, comprehensive support for new, "young" leaders working in the lean area is important.

## 5. Conclusions and discussion

The results of the conducted research allowed for the formulation of the following conclusions regarding the development of lean leaders in the surveyed enterprises:

- All the examined entities are involved in leaders development, which is reflected in the lean principles related to the need for the involvement of all managers and employees in the continuous development and improvement of both the organization and employee competencies.
- Each of the examined enterprises has a Leader Academy, supplemented by additional leaders development opportunities, such as organizing leadership training, providing growth opportunities for employees to test themselves in leadership roles (e.g., in kaizen or problem-solving workshops), teaching leadership in action, organizing mentoring, and sharing best practices.
- Supervisors play a vital role in shaping leadership attitudes and developing leaders; they should set an example of how to be a good leader. Such actions are declared by the examined production directors.
- Production directors generally express satisfaction with the actions they have taken, while also recognizing problems in leaders development, such as poorly developed autonomy and lack of decision-making freedom, weak feedback, and little support from the HR department. In Trenkner (2016) study similar group of respondents pointed out limited budget and the lack of time for both coaching and training as main obstacles for developing leaders in their organizations.

- On the other hand, greater dissatisfaction is shown by the other surveyed respondents, with reported problems including lack of time for leadership development and lack of cooperation in leaders development between entities.
- Individual entities expect support in leaders development from other participants in the organization, such as the HR department, direct supervisors of employees, and top-level managers in building a lean leadership culture and greater autonomy at various management levels.

It should be noted that the results presented pertain solely to the examined production enterprises. The study's limitation to two case studies restricts the generalizability of the conclusions. Consequently, this research should be regarded as pilot studies.

Obtained research results indicate a need for consistency and collaboration among various entities in developing lean leaders. Holmemo et al. (2023) emphasize that organizations should go beyond merely sending individual managers to external courses (e.g., 'black belt' certification) for lean transformation training. Instead, they should focus on building comprehensive internal competences development programs based on lean practices and learning by doing approach. The focus on active learning and knowledge sharing methods corresponds with Saabye (2023) case study results describing an approach to develop leaders as lean learning facilitators to cope with the increasing velocity of changes within the organization.

Setting an example by the supervisor (especially from higher management levels) on how to be a good lean leader, and teaching leadership through the master-apprentice relationship (mentoring, coaching) are conducive to the development of leaders at lower levels in the context of lean implementation. This is also supported by the results of other studies. Study by Zanchi et al. (2021) showed that mentoring actions of the sensei (master, teacher) increase leadership abilities of people, stimulating them to teach others only when they are promoted with the top management sponsorship and endorsement. Research by Trenkner (2016) showed that "there is a sensei in each (of then studied) company that provides lean leaders with coaching during the implementation and the maintenance of lean". Reke et al. (2020) explore the workings of sensei and the role they play in developing lean leaders, who themselves lead the organization's lean transformation, by interviewing executives who worked with sensei rather than following classic consultancy-led best practice implementation.

As research results show, there is a need for a systematic approach to the development of lean leadership in enterprises. The competency development at the individual level should be complemented by an organizational dimension embedded in the company culture. This requires a systemic approach to leadership development, which means defining the individual elements of this system and the connections between them. The fundamental elements of such a systemic approach should include principles and tools for leaders development, shaping cooperation between entities involved in this area, organizational culture, and structural solutions supporting the development of lean leaders and lean leadership in the organization.

In the future it would be reasonable to extend study to a larger group of production enterprises. It would also be cognitively interesting to conduct research in a group of service or commercial enterprises for comparative analysis. Another interesting research direction would be to determine the competency profile of a lean leader, taking into account, for example, the specifics of production, commercial, and service enterprises.

## References

1. Agyabeng-Mensah, Y., Ahenkorah, E., Afum, E., Owusu, D. (2020). The influence of lean management and environmental practices on relative competitive quality advantage and performance. *Journal of Manufacturing Technology Management*, Vol. 31, No. 7, pp. 1351-1372. doi: 10.1108/jmtm-12-2019-0443
2. Allen, S.J., Hartman, N.S. (2008). Leader Development: An Exploration of Sources of Learning. *Organization Development Journal*, Vol. 26, No. 2, pp. 75-87. doi: 10.1108/dlo.2008.08122fad.003
3. Alnadi, M., McLaughlin, P. (2021). Critical success factors of Lean Six Sigma from leaders' perspective. *International Journal of Lean Six Sigma*, Vol. 12, No. 5, pp. 1073-1088.
4. Antony, J., Swarnakar, V., Cudney, E., Pepper, M. (2021). A meta-analytic investigation of lean practices and their impact on organisational performance. *Total Quality Management & Business Excellence*, Vol. 33, pp. 1799-1825. doi: 10.1080/14783363.2021.2003194
5. Ardichvili, A., Natt och Dag, K., Manderscheid, S. (2016). Leadership development: Current and emerging models and practices. *Advances in Developing Human Resources*, Vol. 18, No. 3, pp. 275-285. doi: 10.1177/1523422316645506
6. Arnaiz, F.D., Alvarez, V., Montequin, V.R., Cousillas, S.M. (2022). Identifying critical success factors in continuous improvement projects in a steel company. *Procedia Computer Science*, No. 196, pp. 832-839. doi: 10.1016/j.procs.2021.12.082
7. Campbell, D.J., Dardis, G., Campbell, K.M. (2003). Enhancing Incremental Influence: A Focused Approach To Leadership Development. *Journal of Leadership and Organizational Studies*, Vol. 10, No. 1, pp. 29-44, doi: 10.1177/1071791903010001
8. Connor, D.O., Cormican, K. (2021). Leading from the middle: how team leaders implement lean success factors. *International Journal of Lean six sigma*, Vol. 13, No. 2, pp. 253-275, doi: 10.1108/IJLSS-11-2020-0194
9. Day, D.V., Riggio, R.E., Tan, S.J., Conger, J.A. (2021). Advancing the science of 21st-century leadership development: Theory, research, and practice. *The Leadership Quarterly*, Vol. 32, No. 5, pp. 101557. doi: 10.1108/IJLSS-11-2020-0194
10. Dombrowski, U., Mielke, T. (2013). Lean leadership – fundamental principles and their application. *Procedia CIRP*, Vol. 7, pp. 569-574. doi: 10.1016/j.procir.2013.06.034



11. Holmemo, M.D.Q., Ingvaldsen, J.A., Powell, D.J. (2023). Beyond the lean manager: Insights on how to develop corporate lean leadership. *Total Quality Management & Business Excellence*, Vol. 34, No. 1-2, pp. 19-31. doi: 10.1080/14783363.2021.2022468
12. Holmemo, M.D.Q., Powell, D.J., Ingvaldsen, J.A. (2018). Making it stick on borrowed time: The role of internal consultants in public sector lean transformations. *The TQM Journal*, Vol. 30, No. 3, pp. 217-231. doi: 10.1108/TQM-09-2017-0106
13. Lacerenza, C.N., Reyes, D.L., Marlow, S.L., Joseph, D.L., Salas, E. (2017). Leadership training design, delivery, and implementation: A meta-analysis. *Journal of applied psychology*, Vol. 102, No. 12, pp. 1686-1718. doi: 10.1037/apl0000241
14. Liker, J.K., Convis, G.L. (2012). *Toyota way to lean leadership: Achieving and sustaining excellence through leadership development*. McGraw-Hill Education.
15. Losonci, D., Demeter, K. (2013). Lean production and business performance: international empirical results. *Competitiveness Review: An International Business Journal*, Vol. 23, No. 3, pp. 218-233. doi: 10.1108/10595421311319816
16. Moldoveanu, M., Narayandas, D. (2019). The future of leadership development. *Harvard Business Review*, Vol. 97, No. 2, pp. 40-48. Retrieved from: <https://hbr.org/2019/03/the-future-of-leadership-development>
17. Netland, T.H., Powell, D.J., Hines, P. (2020). Demystifying lean leadership, *International Journal of Lean Six Sigma*, Vol. 11, No. 3, pp. 543-554. doi: 10.1108/IJLSS-07-2019-0076
18. Oon, F., Aziati, A.H.N., Abu, A.S.E. (2021). Business excellence, leadership and lean: a systematic literature review. *International Journal of Business and Society*, Vol. 22, No. 1, pp. 332-345. doi: 10.33736/ijbs.3178.2021
19. Poksinska, B., Swartling, D., Drotz, E. (2013). The daily work of Lean leaders—lessons from manufacturing and healthcare. *Total Quality Management & Business Excellence*, Vol. 24, No. 7-8, pp. 886-898. doi: 10.1080/14783363.2013.791098
20. Reke, E., Powell, D., Olivencia, S., Coignet, P., Chartier, N., Ballé, M. (2020). Recapturing the Spirit of Lean: The Role of the Sensei in Developing Lean Leaders. In: M. Rossi, M. Rossini, S. Terzi (eds.), *Proceedings of the 6th European Lean Educator Conference. ELEC 2019. Lecture Notes in Networks and Systems*, vol 122. Cham: Springer. doi: 10.1007/978-3-030-41429-0\_12
21. Santos, B.B., Sigahi, T.F.A.C., Rampasso, I.S., Moraes, G.H.S.M.D., Leal Filho, W., Anholon, R. (2024). Lean leadership: a bibliometric analysis. *Benchmarking: An International Journal*, Vol. 31, No. 1, pp. 265-277. doi: 10.1108/BIJ-07-2022-0468
22. Seidel, A., Saurin, T.A., Marodin, G.A., Ribeiro, J.L.D. (2017). Lean leadership competencies: a multi-method study. *Management Decision*, Vol. 55, No. 10, pp. 2163-2180. doi: 10.1108/MD-01-2017-0045
23. Seidel, A., Saurin, T.A., Tortorella, G.L., Marodin, G.A. (2019). How can general leadership theories help to expand the knowledge of lean leadership? *Production Planning & Control*, 30(16), pp. 1322-1336. doi: 10.1080/09537287.2019.1612112

24. Simões, J.M.S., Toledo, J.C.D., Lizarelli, F.L. (2024). Front-line lean leader capacities, practices and effects on implementing tools: a survey of leaders in industrial companies. *International Journal of Lean Six Sigma*, Vol. 15, No. 4, pp. 925-956. doi: 10.1108/IJLSS-10-2021-0178
25. Toledo, J.C., Gonzalez, R.V.D., Lizarelli, F.L.L., Pelegriño, R.A. (2019). Lean production system development through leadership practices. *Management Decision*, Vol. 57, No. 5, pp. 1184-1203. doi: 10.1108/MD-08-2017-0748
26. Tortorella, G.L., Fetterman, D., Fogliatto, F.S., Kumar, M., Jurburg, D. (2021). Analysing the influence of organizational culture and leadership styles on the implementation of lean manufacturing. *Production Planning and Control*, Vol. 32, No. 15, pp. 1282-1294. doi: 10.1080/09537287.2020.1799255
27. Trenkner, M. (2016). Implementation of lean leadership. *Management*, Vol. 20, No. 2, pp. 129-142. doi: 10.1515/manment-2015-0055
28. van Beers, J.C., van Dun, D.H., Wilderom, C.P. (2022). Effective hospital-wide lean implementation: top-down, bottom-up or through co-creative role modeling? *International Journal of Lean Six Sigma*, Vol. 13, No. 1, pp. 46-66. doi: 10.1108/IJLSS-02-2021-0024
29. Walentynowicz P. (2013). *Uwarunkowania skuteczności wdrażania Lean management w przedsiębiorstwach produkcyjnych w Polsce*. Gdańsk: Wydawnictwo Uniwersytetu Gdańskiego.
30. Zanchi, M., Gaiardelli, P., Powell, D.J. (2021). *The critical role of sensei in developing lean leaders*. Proceedings of the XXVI Summer School “Francesco Turco”. NTNU Open. Retrieved from: <https://hdl.handle.net/11250/2991523>

## REMOTE WORKING IN METAVERSE: IMPACT ON ORGANISATIONS

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**Purpose:** The research aim of the article was to analyze the impact of remote working at metaverse on organizations, with a particular focus on the aspect of human relations, and team management skills.

**Design/methodology/approach:** The study employed the CAWI (Computer Assisted Web Interview) method. Data collection was conducted in February 2024 through a survey of working individuals across diverse industry sectors. Participants were invited to respond to questionnaire items on a 5-point Likert scale. A total of 111 individuals completed the survey.

**Findings:** The survey found that metaverse impacts remote work positively by enhancing employee engagement, reducing isolation, and offering better training opportunities. However, challenges include implementing meta-work, maintaining work-life balance, and data protection. Managers must adapt with flexibility, embrace change, and trust employees to succeed.

**Research limitations/implications:** The most important limitation of the study is the research sample. The sample size was relatively small, the majority of whom fell within the 18-to-25-year age bracket. In the future, the study should be expanded to a larger and more diverse age range.

**Practical implications:** The findings of our study offer practical implications for managers who must adapt their management style of remote teams to the evolving metaverse context to ensure flexibility, resilience, and trust in their employees' abilities to accomplish their tasks.

**Social implications:** The paper indicates that the metaverse has the potential to reshape interactions among remote workers and transform the future of collaboration and meetings in virtual offices.

**Originality/value:** The study on the impact of the metaverse on the remote work of employees was believed to be the first of its kind to be conducted in Poland.

**Keywords:** remote working, metaverse, organization, virtual reality.

**Category of the paper:** research paper.

## Introduction

The development of information and communication technologies has led to a growing interest in virtual realities, with a broader view of the potential application areas. The application of virtual reality is expanding, and as a result, the concept of the metaverse has gained significant attention. The metaverse is the concept of virtual reality where people create avatars that exist in a three-dimensional virtual world. As the use of virtual reality expands into new forms of work, it is essential to consider the attitudes of users towards these technological advancements, as their perceptions can either enhance the benefits of working from home or further highlight the negative aspects.

Some researchers conclude that the metaverse is merely an incremental advancement of augmented (mixed) reality, a phenomenon observed in the evolution of social media (Stefan, 2022; Park et al., 2023), gaming (Tul-Krzyszczuk, 2022), and entertainment (Kommareddy et al., 2024; Swami, 2024). They contend that it lacks the defining characteristics of a revolutionary innovation. Others have identified qualitative changes in the Internet environment as a factor influencing the penetration of the metaverse by corporations and the emergence of new business models (Szpringer, 2023). Although the metaverse is still in its early stages of development, its potential can already be observed in some areas, including education (Hawkins, 2022; Hollensen et al., 2023), training (Hawkins, 2022; Khatib et al., 2023; Villamil, King, 2024), gaming, wellness (Ullah et al., 2023) and trade (Ball, 2022; Hollensen et al., 2023; Sherman, 2023). As metaverse technology becomes more widely adopted, a greater number of economic opportunities will emerge. These include the opening of new markets and business models, the creation of superior methods of working (Babu et al., 2020), and the transformation of training (Hawkins, 2022; Hollensen et al., 2023) and development (Sherman, 2023). This new series of studies examines the economic potential of the metaverse for different countries and regions around the world (Babu et al., 2020; Sherman, 2023).

The technological advancements being witnessed, combined with the rapid development of the metaverse, present new challenges for many businesses seeking to remain efficient and competitive in the era of remote working. The conducted research aims to answer the question of how remote working in the metaverse will revolutionise existing known working practices. This paper focuses on understanding what changes the metaverse brings to an organisation's structure and what new challenges and opportunities arise in the context of remote working.

By analysing the impact of the metaverse on interpersonal relationships in organisations, the study aims to uncover new forms of interpersonal communication and assess whether the metaverse will contribute to strengthening bonds between employees. In addition, it will focus on the practical aspects of remote working, exploring innovative metaverse tools and technologies and identifying the benefits and potential challenges for employees performing tasks from outside the traditional office.

The analysis of how to manage remote teams in the new reality of the metaverse aims to provide insights into the need to adapt managerial competencies to the changing work environment. The work will consider what skills will be key to effective management in a metaverse context and what strategies may be effective in maintaining the high performance of remote teams. The main research issue is the analysis of the impact of remote working in the metaverse on organizations managers, and employees to help them better understand and adapt to the changing realities of metaverse work. The research questions to support this analysis are:

RQ1: How will the metaverse affect interpersonal relationships in organizations?

RQ2: How will the metaverse impact employee engagement and motivation for work?

RQ3: How will the metaverse influence the well-being of employees?

RQ4: How will managers deal with the new reality of the metaverse when managing remote teams?

## **1. Metaverse environment for remote working**

The phenomenon of remote work presents many unique challenges, as evidenced by the experiences of fully distributed teams, who have reported greater difficulty with regard to team cohesion, remote communication, and productive collaboration. While office-based employees are less likely to experience difficulties with these issues, they also report higher levels of distraction and lower productivity than their remote colleagues. Consequently, the metaverse has the potential to revolutionise the modern workplace, offering a novel alternative that seamlessly integrates the advantages of both traditional office environments and remote work.

### **1.1. Remote working- challenges and benefits**

Remote working is a term that has become familiar to most people since mid-March 2021. That was the start of the COVID-19 pandemic. A large number of employers decided to move work into people's homes wherever possible (Chądrzyński et al., 2022; Marzec et al., 2023). During the pandemic, remote working was carried out by almost 9 % of individuals in Poland, compared to around 6% between 2010 and 2019 (*Statistics Eurostat*, 2024). However, few people had experienced remote working at the time and had to deal with the new reality (Wang et al., 2021). Today, despite the end of the pandemic, remote working is common and normal (Ng et al., 2022). Many companies, schools and public sector organisations have adopted remote working as a permanent feature of the organisation's work (De-la-Calle-Durán, Rodríguez-Sánchez, 2021; Ziomek, 2022b) and most countries have adapted employment law to the conditions of remote working (Kowal, Alicja, 2023). Remote working is “the practice of

an employee working at their home, or in some other place that is not an organisation's usual place of business"<sup>1</sup>.

The development of remote working would not have been possible without the development of ICT technologies and high-speed internet. Król (2022) emphasises that the technological revolution gave rise to remote working (Król, 2022). Mączyńska, on the other hand, stresses that remote work has become more popular among employees precisely because of their use in remote work (Mączyńska, 2021).

Remote working, characterized by employees operating outside traditional office environments, offers a mixed landscape of challenges and benefits that significantly impact both employees and employers. Król (2022), Morrison-Smith and Ruiz (2020) and Roberto et al., (2023) elucidate the multifaceted nature of remote work. Geographical dispersion among employees and their distance from company headquarters profoundly influence the dynamics of remote work. One primary advantage is the elimination of commuting time (Król, 2022; Morrison-Smith, Ruiz, 2020; Roberto et al., 2023). For instance, an employee who typically spends over an hour commuting saves significant time daily when working remotely. This time can be redirected to personal activities or additional rest, which can enhance productivity later in the day. Moreover, reduced commuting decreases the likelihood of traffic accidents and cuts down expenses related to fuel or public transport fares. Roberto et al., (2023) point out that remote working also has a positive effect on the environment, reducing the amount of emissions caused by workers' daily commutes.

Remote work also affords employees the flexibility to live anywhere, liberating them from the constraints of proximity to the office. This flexibility can enhance psychological well-being and allow employees to immerse themselves in different cultures if they choose to work from various global locations. However, this geographical freedom can also introduce challenges, such as limited access to reliable internet in certain areas, which can impede work efficiency.

The psycho-physical impact of remote working varies among individuals (Zdonek, Król, 2021; Zdonek et al., 2017). Some employees thrive in remote settings, enjoying autonomy and flexibility, while others struggle with motivation and the absence of direct social interaction (Mączyńska, 2021; Wang et al., 2021). For those who prefer face-to-face communication, remote work can be less effective due to the reduced richness of non-verbal cues. Furthermore, the flexibility in working hours, often promoted in remote job advertisements, can lead to issues in time management and work-life balance, potentially fostering workaholism.

Distractions at home, such as family, pets, or household chores, can detract from productivity. Conversely, office environments also have their distractions, such as social interactions and noise from shared spaces. The isolation from colleagues can lead to feelings of loneliness and hinder collaborative problem-solving, as virtual communication lacks the

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<sup>1</sup> <https://dictionary.cambridge.org/dictionary/english/remote-working>, 21.01.2024.

immediacy and clarity of in-person interactions (Brenner, Hartl, 2021; Farivar, Richardson, 2021, 2021; Kahtani, 2022).

From an employer's perspective, remote work offers several advantages. The most notable is the reduction in overhead costs associated with maintaining physical office spaces. Employers can also benefit from higher employee availability, as remote workers are more likely to work through minor illnesses that would otherwise necessitate sick leave (Zdonek et al., 2017).

Remote working enables the recruitment of a diverse talent pool from various geographical locations, enhancing the company's competitive edge. However, managing remote employees poses significant challenges, including ensuring productivity and maintaining trust. The difficulty in monitoring remote workers can strain employer-employee relationships, potentially lowering job satisfaction and productivity (Mączyńska, 2021; Ziomek, 2022b).

Additionally, equipping employees with the necessary tools and ensuring data security are crucial concerns. Employers must invest in secure communication tools and establish robust security policies to protect sensitive information, particularly when employees access company resources from potentially insecure public networks (Farivar, Richardson, 2021; Korzynski, Protsiuk, 2022).

As advances in remote work technology have enabled the practice of working from home to gain widespread acceptance, virtual reality (VR) and augmented reality (AR) are facilitating the transition of the metaverse into the mainstream. Poland's metaverse market could grow to a value of between EUR 5 billion and EUR 10 billion by 2035 (Cyfrowa Polska & Komitet Metaversum, 2024)

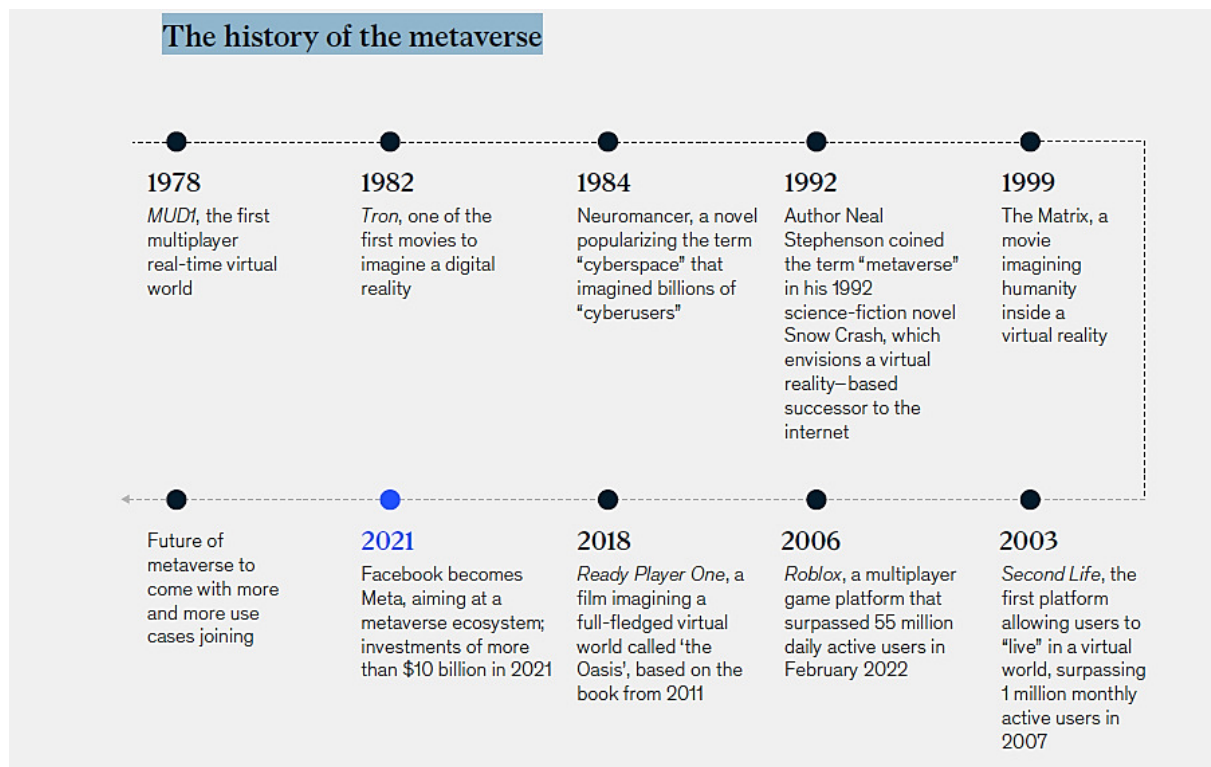
## 1.2. Definitions and history of metaverse

The definition of the metaverse varies, depending on point of view and purpose. The literature on the metaverse draws upon many sources to inform its definitions. These include past research (Park et al., 2023; Park, Kim, 2022), visions from science fiction, and social media (Stefan, 2022; Szpringer, 2023). The most comprehensive review of the definitions of the metaverse is that conducted by Park and Kim (2022), which considers 54 definitions developed between 2000 and 2022. In their analysis, the metaverse is primarily defined in terms of its physical dimension, as a place, a space, or a world.

Park and Kim define the metaverse as *a three-dimensional virtual world where avatars engage in political, economic, social, and cultural activities* (Park, Kim, 2022, p. 4211). Mystakidis (2022) presents the concept of the metaverse as a perpetual and persistent multi-user environment that is unfolding around VR and AR (Mystakidis, 2022). Consequently, some researchers have concluded that it is not possible to provide a precise definition of the metaverse (Dolata, Schwabe, 2023). Additionally, the literature on the subject presents conflicting views on the fundamental elements and attributes of the metaverse (Dolata, Schwabe, 2023; Lee, Lee, 2020; Park, Kim, 2022).

The term metaverse first appeared in a book by Neal Stephens called *Snow Crash*. It was published in 1992. It is a science fiction novel and tells the story of Hiro Protagonist, who is a hacker and pizza delivery man. In the metaverse, he gets a file called *Snow Crash*, and after opening which, his friend suffers brain damage. Hiro launches an investigation to find out from whom he got the infected file (Ball, 2022).

Mathhew Ball mentions in his book (Ball, 2022) that, thanks to Stephen's story, well-known businesspeople such as Jeff Bezos and the founders of Google Earth were inspired to create the solutions described in the book. Following Ball, he points out that Stephen was not the first person to refer to virtual space as a kind of universe. He mentions several authors, including Weinbaum, Bradbury, Gibson, and Wachowski. Each of them described something that contributed to later perceptions of virtual reality. They used terms such as cyberspace, and virtual reality. The history of the metaverse is presented in Figure 1.



**Figure 1.** The history of the metaverse.

Source: (McKinsey&Company, 2022).

With the development of technology also came the development of games. One of the first and more well-known is *Dungeons&Dragons*, which allows the user to delve into a virtual world full of adventure. In the game, the participant has an avatar that can communicate with other players. The next step forward was the development of the playable computer in the 1990s, and with it, games also advanced. Ball describes that the first such fully playable game was *Habitat*. Its users had their avatars, and could explore the virtual world, and interact with other players, but also with the characters that were embedded in it. In addition, players had to obey the laws of the world and exchange resources with other gamers. Other games mentioned



by the author were Pacman and Super Mario Bros. In both, players took on the role of a character who had various obstacles to overcome and had to search for various things to survive.

Another huge step in the development of the virtual era, characterizes *the second wave of the metaverse*, was the creation of 3D games. One of the more popular game series is The Sims. Its first part was created in 2000 and has since gained billions of fans worldwide. By 2022 alone, users played the latest version of the game, The Sims 4, 1.4 billion hours and created 436.5 million Sims which are playable characters. The game is about replicating real life. The characters created are directed by the players. They have character traits, a favourite music or colour. They can move around the world, interact with other characters, work, have to eat, drink, and take care of themselves. They have a needs bar that the player must control. What is more, they can have pets that can also interact, they can go on holidays and rest. It is a life simulator game.

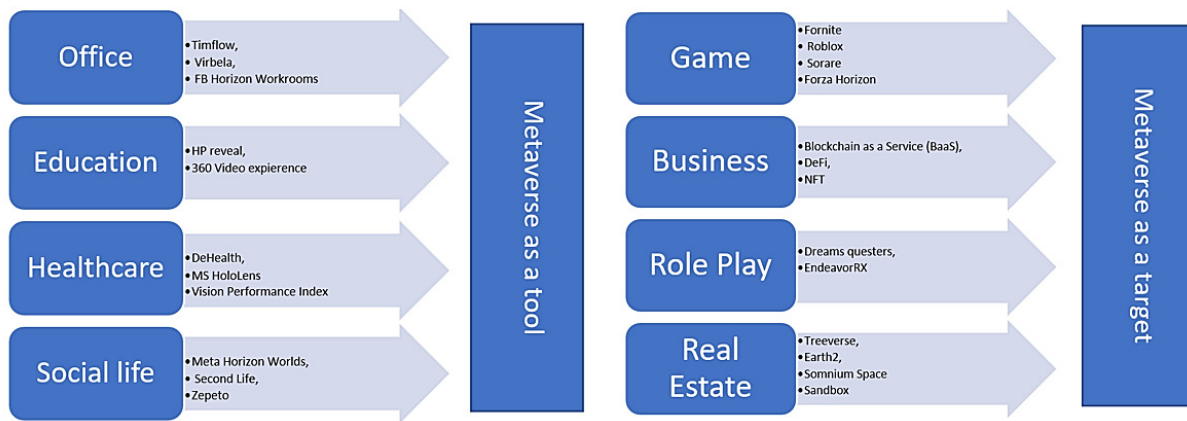
Further examples are games like Minecraft or Fortnite, Playerunknown's Battleground. According to the data: "200 million monthly users spend an average of 2.5 hours a day on Fortnite and Roblox". These unite people from all over the world who create virtual characters and, controlling them, delve into the realm of the cyber world. There are thousands if not more such games, but those listed are the most recognisable and have the most fans.

The *current—third—wave of the metaverse* relates to various technological and economic trends. Since the late 2000s, technological progress has accelerated and new technologies have revolutionised business and leisure. The most radical innovations relate to mobile computing, AI and decentralization. At the same time, new consumer hardware became available, including VR/AR devices. These technologies were applied in metaverses. Cryptocurrency communities used non-fungible tokens (NFTs) to represent and trade virtual property, while Facebook, Inc. rebranded itself as Meta Platforms, Inc. and announced new hardware for the metaverse (McKinsey&Company, 2022).

The following features of the metaverse can be distinguished: 1. persistence, or the ability to remember the user and their environment between sessions, connecting to the real world via IoT or similar technologies, 2. immersion, which provides users with a sense of presence, 3. collaboration and social interactions, through which users can cooperate, socialize, and communicate in digital spaces. 4. interoperability, which allows users to move freely between virtual worlds and transfer their data and resources (e.g. avatars) from one platform to another. This freedom also enables the purchase and sale of resources in emerging markets (Cyfrowa Polska & Komitet Metaversum, 2024).

### **1.3. Metaverse in the organisation- the bright and dark side**

The reason why the current metaverse has attracted more attention than the previous ones is its greater social utility. The applications of the metaverse are classified as *metaverse as a tool* and *metaverse as a target* (Figure 2) (Dwivedi et al., 2022; Li et al., 2024).



**Figure 2.** Applications of the metaverse as a tool and as a target.

Source: Own work based (Dwivedi et al., 2022; Li et al., 2024).

The metaverse, when used as a tool, can be used in conjunction with the real world to perform various tasks that would otherwise be difficult to complete in the physical environment. These tasks may involve exploring remote areas, providing psychological therapy, or training recruits for war zones, for instance. The metaverse replaces familiar environments (e.g., offices, social networking sites, face-to-face classes, and medical treatment) and enables tasks that cannot be easily performed in reality due to issues such as cost. Furthermore, the metaverse simplifies difficult tasks (e.g., aerospace engineering) and increases coherence from a multimodal perspective as a tool (Mahindru et al., 2024).

The evolution of the metaverse represents a substantial advancement in digital technology, integrating virtual and physical reality to generate immersive environments with a diverse array of potential applications. However, the utilisation of the metaverse is not without its advantages and disadvantages.

The metaverse offers unprecedented opportunities for education, particularly for students with disabilities, illnesses, or those living in remote areas (Ball, 2022; Cyfrowa Polska & Komitet Metaversum, 2024). Virtual classrooms can facilitate learning anywhere, such as in hospitals or at home, enabling students to engage with lessons more interactively and dynamically. The use of digital twins, like Metacampus, has shown increased student engagement and participation compared to traditional platforms (Chawinga, 2017; Godber, Atkins, 2021; Villamil, King, 2024).

In the industrial sector, the integration of blockchain and artificial intelligence within the metaverse can streamline decision-making processes and enhance production efficiency by reducing errors (Bataev, 2021; Szpringer, 2023). Machine learning algorithms continuously improve, optimizing production and customer service by analyzing comprehensive data throughout the customer journey (Rojek et al., 2023; Steele, 2023). This capability extends to virtual shopping experiences, where avatars can try on clothes, offering a realistic sense of fit and appearance.

The metaverse revolutionizes human resource management by enabling virtual interviews, job fairs, and company tours. This accelerates the recruitment process and standardizes testing for psychological, knowledge, and skill assessments across various industries, including services, commerce, and civil services. Virtual training sessions, such as those implemented by Bank of America, enhance the quality and efficiency of employee training, contributing to improved customer service and employee development (Hawkins, 2022; Park, Kim, 2022).

Remote working, significantly propelled by the COVID-19 pandemic, is further enhanced by the metaverse. It offers better employee control and integration, reduced commuting time and costs, and improved work-life balance. A healthier work-life balance may be achieved by remote workers experiencing greater difficulty in disconnecting and *switching off* at the end of the day. However, the act of saying goodbye to colleagues in the metaverse and physically removing one's VR headset can facilitate a clear boundary between work and home. This has a similar effect to that of leaving one's office building and embarking on an evening or weekend of relaxation. Employees can also work in simulated environments that foster team collaboration and productivity, even from different locations (Ziomek, 2022b).

Despite its benefits, the metaverse poses risks to physical, social, and emotional health (Szpringer, 2023; Ullah et al., 2023). Excessive time spent in virtual spaces may lead some individuals to prefer the virtual world over the real one, potentially causing social isolation and decreased creativity and innovation among employees (Mączyńska, 2021). The lack of interpersonal interaction can also deteriorate mental health.

The extensive data collection required for personalized experiences in the metaverse raises significant privacy issues. Ensuring the security of this data is crucial to prevent cyber-attacks and data leaks, which could have severe repercussions. Companies must develop robust policies to protect employees' and users' data within this vast virtual space (Mystakidis, 2022).

Managing digital identities in the metaverse is complex, as users can create multiple avatars, complicating identity verification and increasing the risk of identity theft or misuse. Standardized and advanced verification methods will be necessary to manage these virtual identities effectively and ensure security and inclusivity.

The metaverse's technological complexity requires significant investment and adaptation from businesses across different industries. Firms must align their products, services, and marketing strategies with various platforms, adding to operational complexity and costs. Additionally, ethical concerns, such as defining acceptable behavior within the metaverse and addressing issues like virtual crime, data theft, and identity fraud, need to be thoroughly addressed (Chen, 2023).

The presented analysis of the literature indicates the need for further analysis of the use of the metaverse in organisations, especially in the context of remote work. The conducted research in the area of interpersonal relations, productivity and remote team management skills fills a gap in the existing literature on this topic.

## 2. Methodology

The aim of this article is to explore and understand the impact of remote working in the metaverse on organisations, with a particular focus on the human relations aspect, remote working, and team management skills. The technological advancements being witnessed, combined with the rapid development of the metaverse, present new challenges for many businesses seeking to remain efficient and competitive in the era of remote working. The conducted research aims to answer the question of how remote working in the metaverse will revolutionise existing known working practices. This paper focuses on understanding what changes the metaverse brings to an organisation's structure and what new challenges and opportunities arise in the context of remote working.

### 2.1. Collecting data

The research was conducted in February 2024 using the CAVI (Computer-Assisted Web Interview) method with a questionnaire. The selection of the sample was carried out consciously to obtain the highest possible response rate. To increase the percentage of completed surveys, a non-random purposive sampling technique was used.

The survey consists of two sections, a demographic question section and a research problem question section. The demographic questions concern gender, age, education, and the industry in which the respondents work. At the beginning of the second section of questions, there was a brief description of what the metaverse is and how it is used. The second section included 12 questions related to remote work in the metaverse in four research areas (Table 1), namely: relationship, productivity (linked to engagement, motivation and skills), social and psychological aspects, and management and organisation. Respondents were asked to respond to these questions on a 5-point Likert scale.

**Table 1.**  
*Questionnaire structure*

| <b>Questionnaire questions</b>   |  |
|----------------------------------|--|
| <b>Relationship</b>              | Do you think that using Metaverse for team communication will increase the effectiveness of communication between employees?                   |
|                                  | Do you think that using Metaverse on a daily basis will help build stronger relationships between employees working remotely?                  |
|                                  | Do you think that the use of Metaverse on a daily basis will have a negative impact on relationships between co-workers?                       |
|                                  | Do you think that using metaverse will negatively affect the way managers build and maintain relationships with team members?                  |
| <b>Engagement and motivation</b> | Do you think that using Metaverse on a daily basis will increase employees' commitment to their assigned projects and tasks?                   |
|                                  | Do you think that the use of Metaverse in day-to-day duties will help to increase the engagement and motivation of employees working remotely? |
|                                  | Do you think that the use of Metaverse in the context of employee training and skills development will have a positive impact?                 |

Cont. table 1.

|                                      |   |
|--------------------------------------|---|
| <b>Social and well-being aspects</b> | Do you think that using Metaverse during work will reduce feelings of isolation among employees working remotely?                 |
|                                      | Do you think that using Metaverse while working will negatively affect the work-life balance of people working remotely?          |
| <b>Management and organization</b>   | Do you think that using Metaverse will cause data protection and data security issues?  |
|                                      | Do you think that managing employees in the Metaverse requires different methods of managing employees than those currently used? |
|                                      | Do you think that the use of Metaverse will facilitate the monitoring of team progress and the evaluation of team performance?    |

Likert scale: I strongly disagree (1), I rather disagree (2), I have no opinion (3), I rather agree (4), I strongly agree (5).

Source: own study.

## 2.2. Research sample

The research was carried out among working people in different industries, students as well as those who are not employed at the moment. The questionnaire was shared with people associated with different industries to gain the best understanding of the impact of the metaverse on different sectors. 111 people responded to the survey. The structure of respondents is presented in Table 2.

**Table 2.**

*Structure of the survey sample*

|                         | <b>Item</b>                | <b>%</b> |
|-------------------------|----------------------------|----------|
| <b>Gender</b>           | male                       | 51       |
|                         | female                     | 49       |
| <b>Age</b>              | 18 – 25                    | 67       |
|                         | 26 – 35                    | 15       |
|                         | 36 – 45                    | 10       |
|                         | 46 – 55                    | 4        |
|                         | 56 – 65                    | 2        |
|                         | above 65                   | 2        |
|                         | <b>Education</b>           | primary  |
| secondary               |                            | 42       |
| higher                  |                            | 58       |
| <b>Workplace sector</b> | IT sector                  | 27       |
|                         | public sector              | 19       |
|                         | commercial services sector | 14       |
|                         | financial sector           | 10       |
|                         | educational sector         | 11       |
|                         | industrial sector          | 12       |
|                         | entertainment sector       | 3        |
|                         | non-workers                | 4        |

N = 111.

Source: own study.

The gender distribution of respondents was as follows: 51% were women, 57 in number, while 49% were men, 54 in number. Concerning the age of the respondents, there was considerable diversity. The majority of respondents (67%) were within the 18-25 age group,

while 15% were between 26 and 35 years old, 10% were in the 36-45 age group, 4% were between 46 and 55 years old, and 2% were in the 56-65 age group and over 65 years old.

Concerning the educational background of the people participating in the questionnaire 42% of people declared that their education level was secondary, and 58% of individuals stated that their education level was higher. None of the respondents had only a primary level of education.

The survey responses identified the following sectors: IT sector (27%), public sector (19%), commercial services sector (14%), financial sector (10%), educational sector (11%), industrial sector (12%), entertainment sector (3%) and non-workers (4%).

### 3. Results and discussion

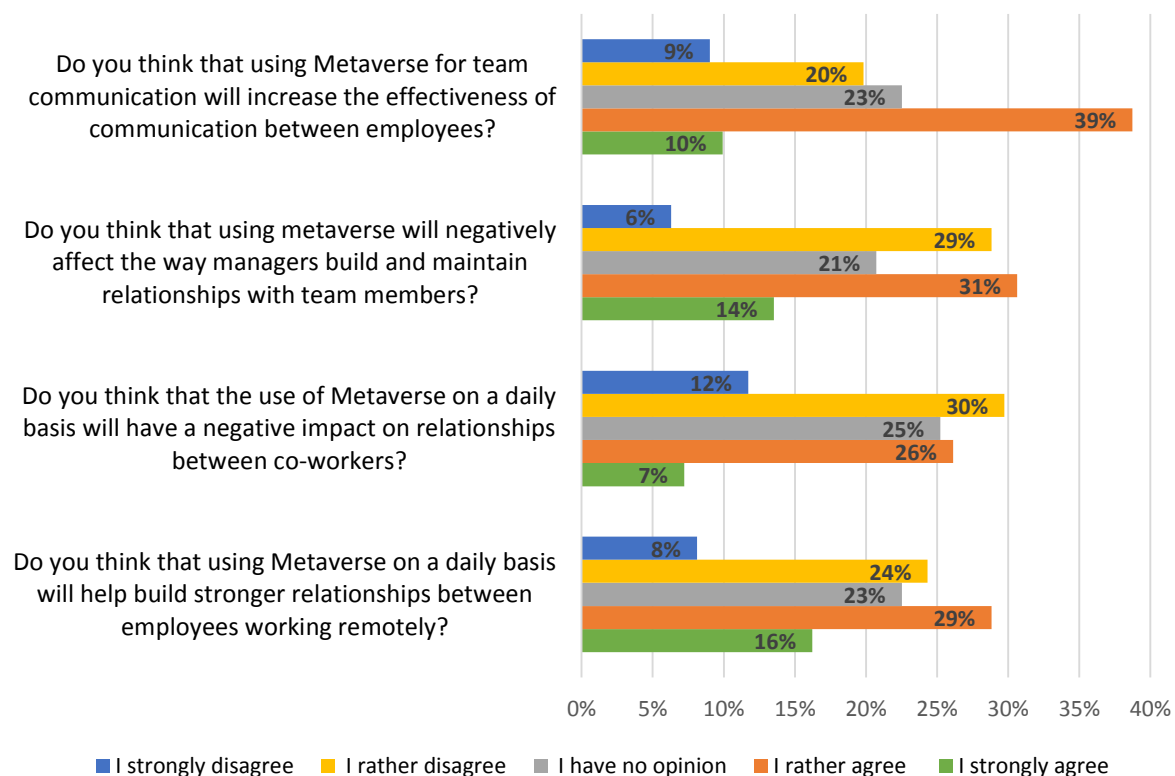
The diversity in the age groups of respondents and the fact that the largest number of people (67%) are in the 18-25 age group suggests that the younger generation is intensely interested and open to exploring the metaverse. This may reflect the dynamic attitude of younger workers towards modern forms of work. The noticeable age diversity in the study provides insight into the diversification of generational knowledge in the context of the metaverse. The younger generation can bring a fresh perspective, while older people can provide valuable experience. The fact that different age groups took part in the survey indicates that different generations are open to innovative technologies such as metaverse. This, in turn, suggests that innovative approaches to remote working are meeting with acceptance among different age groups. Responses from those in the 46-55, 56-65 and over 65 age groups can provide valuable insights into the challenges of introducing metaverse in a remote working context, particularly for those with more seniority. The proportion of men (51%) and women (49%) in the age groups were remarkably close to each other, so it can be suggested that both genders are equally interested. A clear conclusion from the survey results is the dominance of the IT sector, where as many as 30 respondents work. This may indicate the growing role of IT in today's working environment and remote forms of employment. This is similar to Mahindru et al. (2024) (Ewing et al., 2019; Hawkins, 2022; Mahindru et al., 2024; Villamil, King, 2024) study. Also noteworthy is the fact that quite a substantial number (19%) of people are characterised by the public services sector, which also indicates the immense potential of metaverse in remote working in this field.

#### 3.1. Metaverse and interpersonal relationships

Answering the first research question, *RQ1: How will the metaverse affect interpersonal relationships in organisations?* the responses to four survey questions were analysed (Figure 3).

The first supporting question that was raised referred to the use of the metaverse in team communication and whether this communication would increase as a result of it. The largest group (39%) was composed of those who indicated a tendency to agree with the statement that the metaverse will have a positive impact on communication between employees. The next largest group, comprising 23% of respondents, indicates no opinion on this issue. Another 20% express disagreement. The next group, representing 10% of respondents, indicates strong agreement. The smallest group, representing 9% of respondents, indicates strong disagreement that the metaverse will improve communication effectiveness.

In terms of the gender-specific responses of those taking part in the survey, they are interesting. More men strongly agree with the statement that the metaverse will make communication easier. In addition, a smaller number of men have no opinion on the subject, only 8 men, compared to 17 women. Perhaps this is related to the industries they work in or their level of knowledge of the metaverse. Looking at the answers of the respondents and their age, nothing surprising shows up. Just as can be suspected, the younger generation believes that the metaverse will have a positive impact on the facilitation of communication. The results confirm many other studies (Babu et al., 2020; Ball, 2022; Park et al., 2023).



**Figure 3.** The Metaverse and interpersonal relationships in organizations.

Source: own study.

The second question posed was whether the use of the metaverse in remote work would have a negative affect on the relationship building between managers and employees. The majority of respondents (31%) stated that they believe that the use of the metaverse would have a negative impact on the relationship between management and employees. However, almost as many respondents (29%) disagreed with this statement. The existence of such divided opinions may indicate a lack of certainty among respondents regarding the potential impact of the metaverse on the dynamics between employees and managers. The next largest group of respondents (21%) stated that they had no opinion on the subject. The smallest group of respondents (6%) stated that they strongly disagreed with the statement.

The third question also concerned interpersonal relationships, but this time between colleagues. The respondents were asked whether the use of the metaverse daily would have a negative impact on the relationships between co-workers. An examination of the graph containing the answers to this question (Figure 3) indicates that the results are relatively equal, with 30% of respondents disagreeing with the statement and 26% rather agreeing. It should be noted that a quarter of respondents had no opinion on this matter.

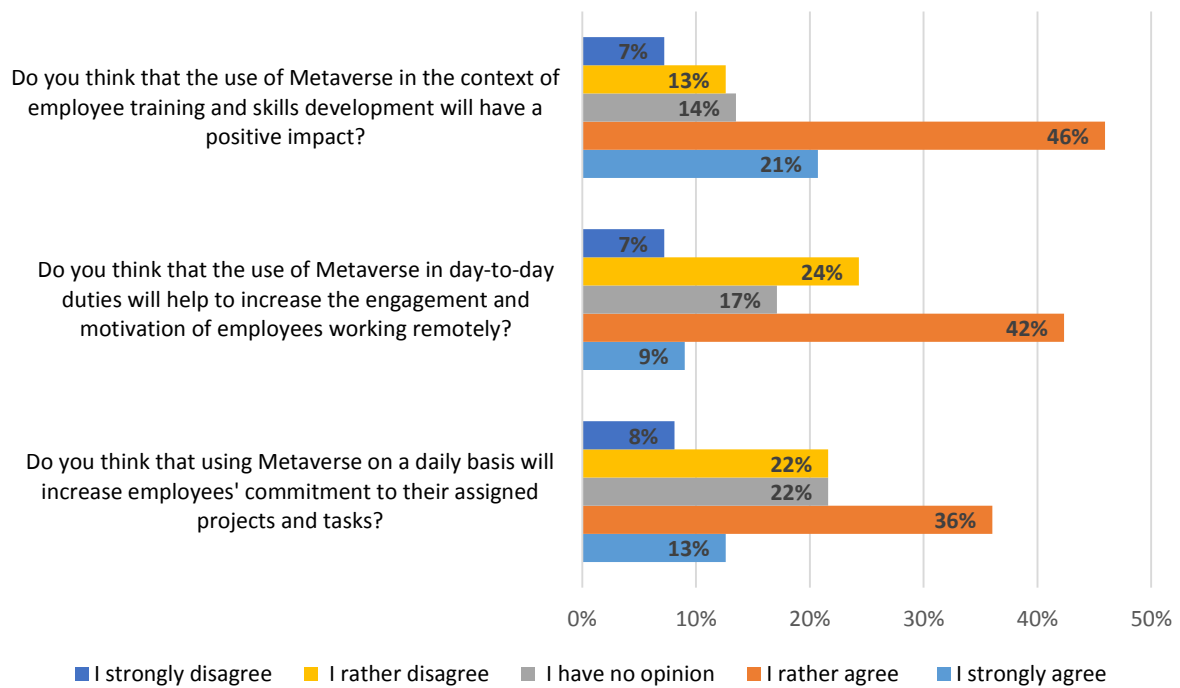
The fourth question addressed the frequency of use of the metaverse in daily life and its potential to facilitate the formation of stronger interpersonal connections among employees who work remotely. The largest group of respondents indicated that they agreed with the statement (29%). However, a significant proportion of respondents indicated that they either disagree (24%) or have no opinion on the subject (23%). The smallest proportion of respondents indicated that they strongly disagreed with the statement (8%). Additionally, a notable number of respondents indicated that they strongly agreed that using the metaverse would help build relationships (16%).

A comprehensive analysis of the total responses received leads to the conclusion that the majority of respondents believe that the metaverse will have a positive impact on the quality of interpersonal relationships within organisations. This is of significant consequence for managers and organisations, as it will facilitate the attainment of high performance. Unsurprisingly, younger generations are more inclined to utilise the metaverse. This may be attributed to their proclivity towards adopting novel technologies and the flexibility afforded by remote work in the metaverse. Furthermore, they may also be curious about the potential of the metaverse in the future and the developments it may bring about. Older generations may be less interested, as they tend to be content with their current lifestyle and work, and are less willing to change. However, the responses of the oldest generation are noteworthy, as in many cases they are in favour of using the metaverse. This demonstrates the importance of considering the opinions of this demographic in the implementation of this tool in different companies.



### 3.2. Metaverse and engagement and motivation of employee

Answering the second research question, *RQ2: How will the metaverse impact employee engagement and motivation for work?* the responses to three survey questions were analysed (Figure 4).



**Figure 4.** The Metaverse and engagement and motivation.

Source: own study.

The first question in this group aimed to explore whether respondents believe that using metaverse as a training and skills development aid for employees would have a positive impact on them. As can be observed (figure 4), the large majority agrees with the statement both rather (46%), and strongly (21%). This is important because, as Hawkins (2022) points out, developing skills using virtual reality can significantly increase employee engagement and productivity (Hawkins, 2022).

The next question was designed to explore the views of the participants in the survey on the use of metaverse in everyday work and whether it would increase the engagement of employees who perform remote work. Most people were in favour of the fact that the use of the metaverse would have a rather positive effect on employee engagement (42%) as indicated in their research Chawinga (2017), Godber & Atkins (2021), Villamil & King (2024). However, opinions were divided, as the next group was formed by those who rather disagreed with this statement (24%). The following group was made up of those who did not have an opinion (17%). The smallest group were those who strongly disagreed (7%), and a little more were those who strongly agreed (9%).

The third question that was asked focused on whether the use of metaverse would contribute to increased dedication to projects and tasks at work. Similar to the first two questions and the responses analysed, it can be seen that the majority of people rather agreed with the statement that using metaverse at work will lead to increased employee commitment (36%). An equal number of people answered that they rather disagreed with the statement (22%) or that they had no opinion (22%). A significant minority denied the question that was posed. A significantly larger percentage of respondents in the youngest age group (26-35) agreed with the statement that the use of metaverse would have a favourable effect on daily routines and commitment (52%). In the 36-45 and 46-55 groups, there was only one person who strongly agreed. In the 46-55 group there was an objection to the statement made. In the group 36-45, most people didn't have an opinion on the subject. In analysing the sectors in which respondents work the metaverse had the greatest support in the IT sector. There, most people believe that the use of the metaverse will support attachment to assigned tasks. In the public sector, it is noticeable that a lot of people do not have an opinion on this topic. In the commercial services sector, on the other hand, it is observable that more people oppose than support this statement.

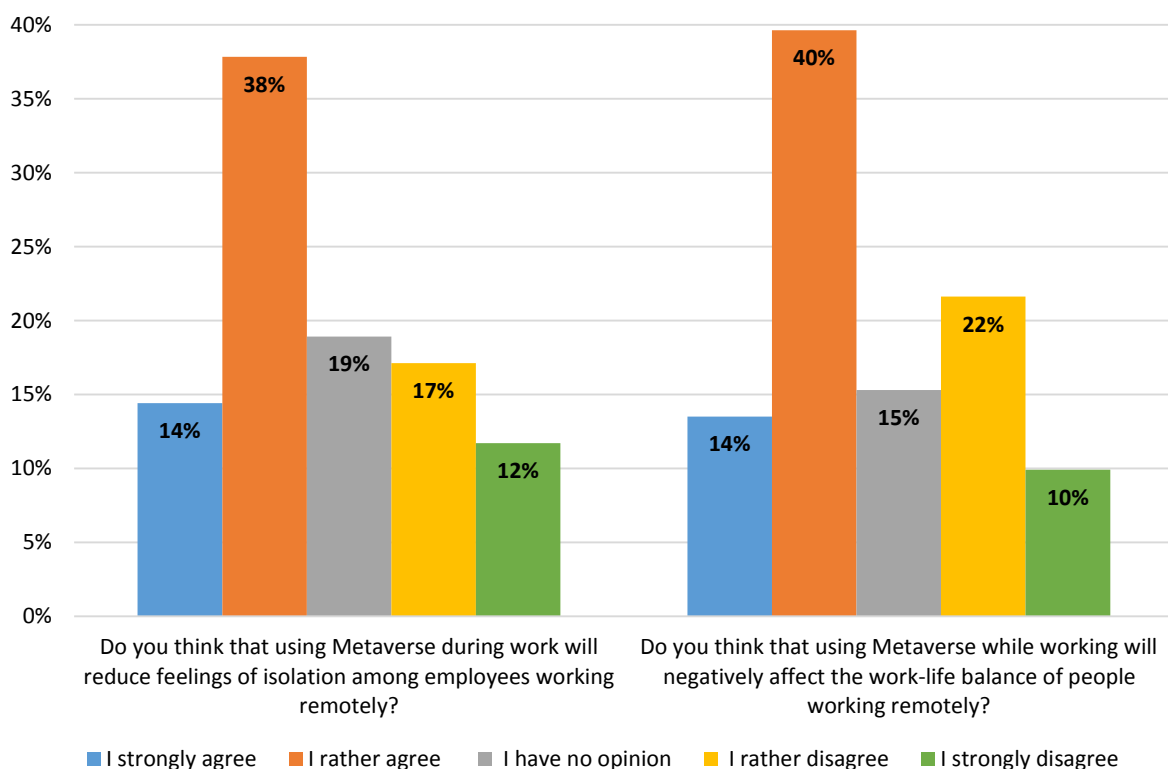
Analysing all these answers given, several conclusions can be drawn. The main and obvious one is that the metaverse will have an impact on remote working and the various aspects related to it. The use of the metaverse and what it offers will have a positive impact on the commitment of employees to their tasks. This is not surprising, as through the metaverse, various enrichments and facilities can be introduced that will help employees in interesting ways. The aforementioned virtual offices will be equipped with a number of tools which can make work more structured and organised.

### **3.3. Metaverse and social and well-being aspect**

Answering the next research question, *RQ3: How will the metaverse influence the well-being of employees?* the respondents were asked 2 questions. Analyses of these questions indicate that the metaverse can have both a positive and negative impact on the health and well-being of employees the responses to four survey questions were analysed (Figure 5).

On the one hand, the majority of people *rather agreed* (38%) and *strongly agreed* (14%) with the statement that using metaverse would reduce feelings of isolation among employees who work remotely. On the other hand, a large number of people believed that the use of the metaverse has a negative impact on employees' work-life balance. In the case of this question, the answers were remarkably interesting. The majority of people *rather agreed* (40%) and *strongly agreed* (14%) with the statement that the use of the metaverse has a negative impact on the reconciliation of work and personal life. The next group were those who *rather disagree* (22%). They are followed by respondents who have no opinion on the subject (15%). The least numerous group are those who *strongly disagree* (10%).

By analyzing the above questions, the following conclusions can be drawn. Virtual offices in the metaverse contribute to decreasing feelings of isolation among remote workers. Similarly, Szpringer (2023) and Ullah et al. (2023) point out that the metaverse poses threats to physical, social and emotional health, causing social isolation, decreased creativity and worsening mental health. Thanks to the face-to-face avatar interactions, employees may feel part of a community and perhaps be accompanied by a sense of togetherness. A negative aspect of using the metaverse, according to the respondents, is the problem of maintaining a work-life balance. Respondents agree with this statement regardless of the industry they work in. Indeed, balancing work and personal life in this case can be challenging, as the virtual offices, trips or training courses it offers can be very absorbing.



**Figure 5.** The Metaverse and social and psychological aspect.

Source: own study.

### 3.4. Metaverse and management of employee

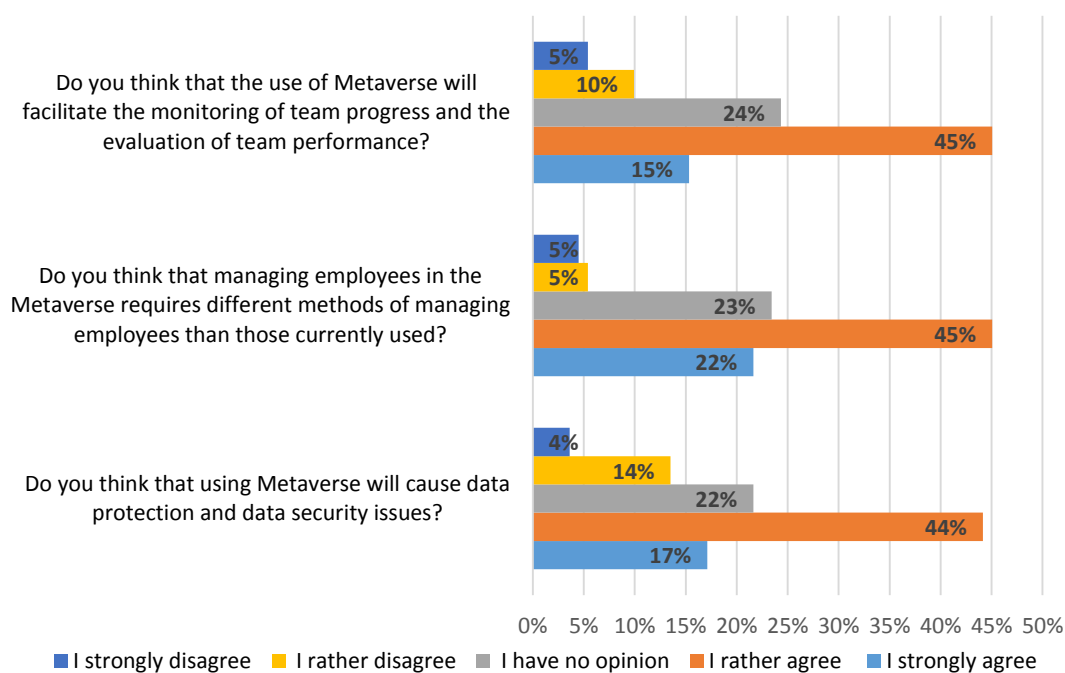
Answering the last research question, *RQ4: How will managers deal with the new reality of the metaverse when managing remote teams?* the responses to three survey questions were analysed (Figure 6).

The first question concerned using metaverse to enable easier team progress and evaluation monitoring. The vast majority of people (45%), agreed that the use of metaverse would make it simpler to monitor and assess the progress of employees. However, a significant number of

people, as many as one-fourth (24%), had no opinion on this subject. This may be due to the lack of experience of managers in this area.

In the second question, similarly to the previous one, most respondents agreed that managing employees in the metaverse requires using different management methods (45%). Again, similarly to the previous question, a quarter of people (25%) had no opinion on the subject (23%).

A significant consideration when implementing remote work within the metaverse is the protection of sensitive data. The majority of respondents indicated that working in the metaverse could potentially lead to challenges in maintaining the security of digital information (44%). Again, a surprisingly large number of people had no opinion on the matter (22%).



**Figure 6.** The Metaverse and management of employee.

Source: own study.

Considering all the responses, it is possible to notice several findings that emerge. The most interesting one is that a lot of people think that the use of the metaverse requires different methods of managing employees. New ways of managing and new tools will absolutely be needed. All this will have to evolve as the metaverse and the work in it develops. Another thing to note is that most people believe that the use of the metaverse will make it easier to assess and monitor corporate processes. This is quite likely to be the case because of the tools that working in the metaverse offers. This will be particularly feasible in industries that are already familiar with the remote working model, as they will not require an extended period of adjustment. It is also essential to emphasise the importance of data protection in the metaverse, as security issues will have to be addressed (Chen, 2023; Mystakidis, 2022).

## 4. Conclusion

The metaverse promises substantial benefits, from revolutionizing education and industrial processes to enhancing remote working and human resource management. However, these advantages are counterbalanced by significant challenges, including health risks, privacy and data security concerns, identity management issues, and ethical dilemmas. Effective utilization of the metaverse will require careful management and innovative solutions to mitigate its risks while maximizing its potential.

The emergence of the metaverse has unquestionably revolutionised many spheres in the corporate environment, both internal and external. It has placed many obstacles in their path as well as assisted in many aspects. It can be described as a definite beginning of an emerging era. It is difficult to say conclusively in which direction it will lead all concerned.

The article reveals that the transition to remote working presents both opportunities and challenges. The benefits, such as increased flexibility, reduced commuting time, and lower operational costs, are balanced by drawbacks like potential isolation, motivation issues, and security concerns. Effective remote work requires clear communication and collaboration between employees and employers to navigate these complexities successfully. As the workplace evolves, continued adaptation and refinement of remote work policies will be essential to maximize its potential while mitigating its risks.

Managers will have to make changes to the organisation that will involve the entire system of its operations. Technological developments will force them to change the way they delegate tasks, evaluate their performance, or assess the progress of employees. How employees are trained will also change, with some training moving entirely into the meta-workspace, others only partially and still others remaining for the time being only in the real space. Research has shown that remote working in the metaverse can lead to an increase in employee efficiency and productivity. The virtual working environment will eliminate commuting problems, allow for better time management, and enable working conditions to be more easily adapted to individual employees' needs.

In addition, the use of metaverse will also introduce several concerns to companies. The first relates to the lack of advanced technology and the fact that it will have to be introduced as soon as possible if companies want to use the metaverse. This is combined with huge sums of money and training of staff who need to have a basic knowledge of how to use the technology. Traditional methods of managing teams may prove ineffective, forcing managers to develop new motivational strategies and communication methods. Building a sense of belonging and commitment among employees who do not meet in person will also be crucial. Another problem is related to being cautious in the use of metaverse. As it is not yet thoroughly legislated, its use may be associated with data leaks or other related problems.

Based on the research, it can be seen that the metaverse will affect interpersonal relationships in organisations. Contacts between colleagues will take place in an unusual way than before. The use of the metaverse will influence the efficiency of communication, making it easier in some cases. In addition, the relationships established by employees will be stronger, through communication that will be more indirect than that which takes place when using the various virtual platforms. Employees will also be more engaged in their tasks, as their performance will be more interesting, and more varied. They will also feel less isolated, due to the possibility of meetings in the metaverse. In conclusion, using the metaverse will not have a negative impact when it comes to the relationships of employees working remotely, quite the contrary.

The results of the study also have practical implications for managers. First of all, the metaverse will change their managing style and reveal new skills. Managers will need to ensure that they maintain contact with employees and that information flows very quickly. From the answers given by the respondents, it seems that this could be a major problem for managers. They will have to become more flexible in their decision-making as the metaverse will require this. How training is delivered will also change. Evaluating employee progress and monitoring them will be easier in the metaverse, according to the research. This is due to the range of new tools that will be available and the fact that what will take place in the metaverse will leave its 'mark.'

The results of the survey indicate that a relatively large number of individuals are already willing to utilise or intend to utilise the metaverse in a professional environment. However, some respondents expressed reservations about the use of the metaverse in their work. This is an understandable result, particularly given the diverse range of questions posed to respondents.

An interesting finding can be drawn after analysing the responses of those in the IT industry because it is most likely that this is where the metaverse will happen the fastest. They were very divided on many issues, which just demonstrates that it is most likely that more education is needed in this area to help employees understand the subject. On the other hand, it may be that IT employees are the most knowledgeable about the metaverse at the moment, and that may be where the big divide comes from. A similar case can be found in the analysis of the responses of different people according to their age. It is most likely that the difference in responses is due to their knowledge. Young people are more sceptical about the use of metaverse at work on some issues and older people on others.

There is one conclusion that can be made after analysing the entirety of all the responses, further research into this topic is needed, as it will definitely grow increasingly and perhaps become everyone's day-to-day reality in the future. Especially that the limitation of the study was the relatively small sample size. In future studies, it would be beneficial to expand the sample to include a larger and more diverse age range.

## References

1. Babu, S., Vr, H., Subramoniam, S. (2020). Impact of Social Media on Work Performance at a Technopark in India. *Metamorphosis*, 19(1), 59–71. <https://doi.org/10.1177/0972622520962949>
2. Ball, M. (2022). *The Metaverse: And How It Will Revolutionize Everything*. Liveright.
3. Bataev, A.V. (2021). *Industry 4.0: Development and Use of Neural Network Technologies in the Modern World Robotics*. Proceedings of the 37th International Business Information Management Association Conference (IBIMA), Innovation Management and Information Technology Impact on Global Economy in the Era of Pandemic, 2140–2149.
4. Brenner, B., Hartl, B. (2021). The perceived relationship between digitalization and ecological, economic, and social sustainability. *Journal of Cleaner Production*, 315, 128128. <https://doi.org/10.1016/j.jclepro.2021.128128>
5. Chądzyński, M., Gruzziel, K., Kacperska, E., Klusek, T., Utzig, M. (2022). *Polska w dobie cyfryzacji (I)*. Szkoła Główna Gospodarstwa Wiejskiego SGGW w Warszawie.
6. Chawinga, W.D. (2017). Taking social media to a university classroom: Teaching and learning using Twitter and blogs. *International Journal of Educational Technology in Higher Education*, 14(1), 3. <https://doi.org/10.1186/s41239-017-0041-6>
7. Chen, M. (2023). The philosophy of the metaverse. *Ethics and Information Technology*, 25(3), 41. <https://doi.org/10.1007/s10676-023-09714-w>
8. Cyfrowa Polska, & Komitet Metaversum (2024). *Nowa era cyfrowego rozwoju. Metaversum dla Polski*.
9. De-la-Calle-Durán, M.-C., Rodríguez-Sánchez, J.-L. (2021). Employee Engagement and Wellbeing in Times of COVID-19: A Proposal of the 5Cs Model. *International Journal of Environmental Research and Public Health*, 18(10), Article 10. <https://doi.org/10.3390/ijerph18105470>
10. Dolata, M., Schwabe, G. (2023). What is the Metaverse and who seeks to define it? Mapping the site of social construction. *Journal of Information Technology*, 38(3), 239–266. <https://doi.org/10.1177/02683962231159927>
11. Dwivedi, Y.K., Hughes, L., Baabdullah, A.M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M.M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C.M.K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D.P., Gustafsson, A., Hinsch, C., Jebabli, I., ... Wamba, S.F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, 66, 102542. <https://doi.org/10.1016/j.ijinfomgt.2022.102542>

12. Farivar, F., Richardson, J. (2021). Workplace digitalisation and work-nonwork satisfaction: The role of spillover social media. *Behaviour & Information Technology*, 40(8), 747–758. <https://doi.org/10.1080/0144929X.2020.1723702>
13. Godber, K.A., Atkins, D.R. (2021). COVID-19 Impacts on Teaching and Learning: A Collaborative Autoethnography by Two Higher Education Lecturers. *Frontiers in Education*, 6. <https://www.frontiersin.org/articles/10.3389/educ.2021.647524>
14. Hawkins, M. (2022). Virtual Employee Training and Skill Development, Workplace Technologies, and Deep Learning Computer Vision Algorithms in the Immersive Metaverse Environment. *Psychosociological Issues in Human Resource Management*, 10(1), 106–120.
15. Hollensen, S., Kotler, P., Opresnik, M.O. (2023). Metaverse – the new marketing universe. *Journal of Business Strategy*, 44(3), 119–125. <https://doi.org/10.1108/JBS-01-2022-0014>
16. Kahtani, N.S.A. (2022). A Study on How Psychological Capital, Social Capital, Workplace Wellbeing, and Employee Engagement Relate to Task Performance. *SAGE Open*, 12(2), 21582440221095010–21582440221095010.
17. Khatib, M.E., Al Khayat, A., Mansoori, S.A., Alzaabi, A., Ankit, A. (2023). Metaverse Skills for Executives and Senior Managers: The Pros and Cons. *2023 International Conference on Business Analytics for Technology and Security (ICBATS)*, 1–7. <https://doi.org/10.1109/ICBATS57792.2023.10111483>
18. Kommareddy, N., Sujithvarma, P., Kuma, K. (2024). *Metaverse: The new reality of entertainment and business world*. 1st International Conference, ‘Resonance’: On Cognitive Approach, Social Ethics and Sustainability (pp. 179–188). Routledge. <https://doi.org/10.4324/9781003397175-14>
19. Korzynski, P., Protsiuk, O. (2022). What leads to cyberloafing: The empirical study of workload, self-efficacy, time management skills, and mediating effect of job satisfaction. *Behaviour & Information Technology*, 1–12. <https://doi.org/10.1080/0144929X.2022.2159525>
20. Kowal, J., Alicja, M.-L. (2023, April 8). *Remote work in Poland—2024 Guide*. Dudkowiak Kopeć & Putyra. <https://www.dudkowiak.com/employment-law-in-poland/remote-work/>
21. Król, M. (2022). *Praca zdalna cechy, uwarunkowania, implikacje dla procesu pracy*. Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach. [https://onepress.pl/ksiazki/praca-zdalna-cechy-uwarunkowania-implikacje-dla-procesu-pracy-malgorzata-krol,e\\_2z3c.htm](https://onepress.pl/ksiazki/praca-zdalna-cechy-uwarunkowania-implikacje-dla-procesu-pracy-malgorzata-krol,e_2z3c.htm)
22. Lee, S.Y., Lee, S.W. (2020). Social Media Use and Job Performance in the Workplace: The Effects of Facebook and KakaoTalk Use on Job Performance in South Korea. *Sustainability*, 12(10), Article 10. <https://doi.org/10.3390/su12104052>
23. Li, Y., Gunasekeran, D.V., RaviChandran, N., Tan, T.F., Ong, J.C.L., Thirunavukarasu, A.J., Polascik, B.W., Habash, R., Khaderi, K., Ting, D.S.W. (2024). The next generation of



- healthcare ecosystem in the metaverse. *Biomedical Journal*, 47(3), 100679. <https://doi.org/10.1016/j.bj.2023.100679>
24. Mączyńska, E. (2021). Remote work. Pros and cons. *Polityka Społeczna*, 566-567(5-6), 10-18. <https://doi.org/10.5604/01.3001.0015.2580>
25. Mahindru, R., Bapat, G., Bhojar, P., Abishek, G.D., Kumar, A., Vaz, S. (2024). Redefining Workspaces: Young Entrepreneurs Thriving in the Metaverse's Remote Realm. *Engineering Proceedings*, 59(1), Article 1. <https://doi.org/10.3390/engproc2023059209>
26. Marzec, M., Szczudlińska-Kanoś, A., Freund, B., Miceikienė, A. (2023). Innovative work-life balance after COVID-19. *International Journal of Contemporary Management*, 59(3), 32–64. <https://doi.org/10.2478/ijcm-2022-0017>
27. McKinsey&Company (2022, June). *Value creation in the metaverse*. <http://ceros.mckinsey.com/metaverse-report-desktop>
28. Morrison-Smith, S., Ruiz, J. (2020). Challenges and barriers in virtual teams: A literature review. *SN Applied Sciences*, 2(6), 1096. <https://doi.org/10.1007/s42452-020-2801-5>
29. Mystakidis, S. (2022). Metaverse. *Encyclopedia*, 2(1), Article 1. <https://doi.org/10.3390/encyclopedia2010031>
30. Ng, P.M.L., Lit, K.K., Cheung, C.T.Y. (2022). Remote work as a new normal? The technology-organization-environment (TOE) context. *Technology in Society*, 70, 102022. <https://doi.org/10.1016/j.techsoc.2022.102022>
31. Park, H., Ahn, D., Lee, J. (2023). *Towards a Metaverse Workspace: Opportunities, Challenges, and Design Implications*. Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems, 1–20. <https://doi.org/10.1145/3544548.3581306>
32. Park, S.-M., Kim, Y.-G. (2022). A Metaverse: Taxonomy, Components, Applications, and Open Challenges. *IEEE Access*, 10, 4209–4251. IEEE Access. <https://doi.org/10.1109/ACCESS.2021.3140175>
33. Roberto, R., Zini, A., Felici, B., Rao, M., Noussan, M. (2023). Potential Benefits of Remote Working on Urban Mobility and Related Environmental Impacts: Results from a Case Study in Italy. *Applied Sciences*, 13(1), Article 1. <https://doi.org/10.3390/app13010607>
34. Rojek, I., Mikołajewski, D., Mroziński, A., Macko, M. (2023). Machine Learning- and Artificial Intelligence-Derived Prediction for Home Smart Energy Systems with PV Installation and Battery Energy Storage. *Energies*, 16(18). Scopus. <https://doi.org/10.3390/en16186613>
35. Sherman, R. (2023, May 9). Understanding the Economic Potential of the Metaverse. *Meta*. <https://about.fb.com/news/2023/05/economic-potential-of-the-metaverse/>
36. *Statistics Eurostat* (2024). Employed Persons Working from Home as a Percentage of the Total Employment, by Sex, Age and Professional Status. [https://ec.europa.eu/eurostat/databrowser/view/LFSA\\_EHOMP\\_\\_custom\\_1570583/default/table?lang=en,%20accessed%202022.01.2024](https://ec.europa.eu/eurostat/databrowser/view/LFSA_EHOMP__custom_1570583/default/table?lang=en,%20accessed%202022.01.2024)

37. Steele, J.L. (2023). To GPT or not GPT? Empowering our students to learn with AI. *Computers and Education: Artificial Intelligence*, 5, 100160. <https://doi.org/10.1016/j.caeai.2023.100160>
38. Swami, P. (2024). Metaverse: Transforming the User Experience in the Gaming and Entertainment Industry. In: *Research, Innovation, and Industry Impacts of the Metaverse* (pp. 115-128). IGI Global. <https://doi.org/10.4018/979-8-3693-2607-7.ch007>
39. Szpringer, W. (2023). Metaverse – nadmierny szum czy nowe szanse dla biznesu? (Cz. 1). *Kwartalnik Nauk o Przedsiębiorstwie*, 68(2), Article 2.
40. Tul-Krzyszczuk, A. (2022). The metaverse in hospitality management in the age of digital transformation. *Ekonomika i Organizacja Logistyki*, 8(4), Article 4. <https://doi.org/10.22630/EIOL.2022.7.4.31>
41. Ullah, H., Manickam, S., Obaidat, M., Laghari, S.U.A., Uddin, M. (2023). Exploring the Potential of Metaverse Technology in Healthcare: Applications, Challenges, and Future Directions. *IEEE Access*, 11, 69686–69707. IEEE Access. <https://doi.org/10.1109/ACCESS.2023.3286696>
42. Villamil, A., King, S. (2024). A Humane Social Learning-Informed Metaverse: Cultivating Positive Technology Experiences in Digital Learning Environments. *Cyberpsychology, Behavior, and Social Networking*, 27(1), 47–56. <https://doi.org/10.1089/cyber.2023.0001>
43. Wang, B., Liu, Y., Qian, J., Parker, S.K. (2021). Achieving Effective Remote Working During the COVID-19 Pandemic: A Work Design Perspective. *Applied Psychology*, 70(1), 16–59. <https://doi.org/10.1111/apps.12290>
44. Zdonek, D., Król, K. (2021). The Impact of Sex and Personality Traits on Social Media Use during the COVID-19 Pandemic in Poland. *Sustainability*, 13(9), Article 9. <https://doi.org/10.3390/su13094793>
45. Zdonek, I., Podgórska, M., Hysa, B. (2017). The Competence for Project Team Members in the Conditions of Remote Working. *Foundations of Management*, 9(1), 213–224. <https://doi.org/10.1515/fman-2017-0017>
46. Ziomek, A. (2022a). *Produktywność pracy zdalnej w ocenie pracowników w warunkach gospodarki cyfrowej*. null. <https://doi.org/10.18559/978-83-8211-139-2>
47. Ziomek, A. (ed.) (2022b). *Produktywność pracy zdalnej w ocenie pracowników w warunkach gospodarki cyfrowej*. Wydawnictwo UEP w Poznaniu. <https://doi.org/10.18559/978-83-8211-139-2>

## CONSIDERATIONS FOR DEVELOPING RESEARCH QUESTIONS WITHIN THE LITERATURE DOMAIN OF ORGANIZATIONAL IDENTITY AND IDENTIFICATION

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**Purpose:** The main aim of this paper is to show how problematization can be used based on selected research whose assumptions are to be discussed. In addition to this, the paper aims to formulate views as to what aspects are to be taken into account when looking for new research questions by the application of the dialectical approach.

**Design/methodology/approach:** Assumptions of selected research are to be analyzed and when it turns out to be justified attempts are made to outline how analyses under consideration can be developed further.

**Findings:** As a result of concern about the lack of generations of more influential theories in the field of management science, problematization was proposed as a methodology whose aim is to help researchers not only identify but also challenge assumptions on which their conclusions are based. The paper includes considerations for propositions of how problematization can be applied to studies on organizational identity and identification. When possible and justified, propositions of some extensions based on problematization logic are developed.

**Originality/value:** Whereas problematization has already been applied to generating research questions in general, and to organizational identity and identification studies in particular, further analyses of what new aspects of those studies can be scrutinized deserve further attention and in this paper, by paying attention to this field the author attempts to make the initial contribution in this direction.

**Keywords:** problematization, dialectical approach, organizational identity, identification.

**Category of the paper:** conceptual paper.

### 1. Introduction

When looking for a chance to prepare an influential theory, one should take into account what McKinley, Mone, and Moon (1999) argued with regard to when the theory can become interesting for other researchers. A theory like this actually should "deny taken-for-granted assumptions of their scholarly audiences" (McKinley, Mone, Moon, 1999, p. 636). The core of

the problem is that the conditions that should be met by the theory, which is aimed at receiving attention, is that it should simultaneously be connected to established literature and it should differ significantly from it. Hence, theory needs to be characterized by “novelty and continuity” (McKinley, Mone, Moon, 1999, p. 637). What is important, there should be a “dynamic tension and interplay between novelty and continuity” in such a way that neither novelty nor continuity should dominate (McKinley, Mone, Moon, 1999, p. 637). Actually, the issue appears to be somewhat similar to the one described by the optimal distinctiveness concept proposed by Brewer (1991) who argued that when identifying with a social group, individuals need to be similar to a chosen reference group and, at the same time, they need to be sufficiently distinctive from this reference group – the group is believed to balance best their opposing needs (Gioia, Hamilton, 2016; Ravasi, Rekom, 2003). Hence, assuming that the issue for theory relates to “similarities and differences at the same time” (Ravasi, van Rekom, 2003, p. 127) as well, the question may arise as to how one can recognize and define these similarities or differences to be more effective when attempting to propose new research topics. The main idea behind the proposition presented by Alvesson and Sandberg (2011) is that researchers are not able to problematize the current literature by simply extending it. As a result, the next efforts put into filling a given gap in the literature finally tend to reinforce existing theories instead of challenging them. Here, problematization can be understood as an alternative to identifying the gap in the literature as it is considered the way to find research areas based on reaching for the roots of a given idea or conception (Lenart-Gansiniec, 2021). When applying the problematization methodology not only should other stances and the selected domain of literature be dialectically interrogated, but also the researcher's familiar position is to be revised in this way. Hence, researchers are encouraged to use not only their favorite theoretical position. Some reflections on what types of issues can be taken into account when applying this methodology are developed in the following paragraphs.

## **2. Theoretical background**

Lenart-Gansiniec (2021, p. 15) indicates three possible ways to choose an interesting research field. These are the researcher's interest, identification of the gap in the literature as well as problematization. Here, it can be added that identity and identification research although well past its infancy was described as having many open issues for theory construction or empirical research (Ravasi, van Rekom, 2003). They included intellectual sources or matters related to the conceptualization of the construct and remain still current and important (Knorr, Hein-Pensel, 2024). This may be why when making comparisons between problematization and ways of generating research questions focused on identifying gaps in existing literature, Alvesson and Sandberg (2011, p. 260) paid attention to papers within the domain of “identity

constructions in organizations". When presenting their view on problematization methodology, Alvesson and Sandberg (2011) described different types of assumptions that are open for problematization. Having them defined, it should be easier for researchers to look for differences in their approach with comparison to other approaches as well as to have it more clear what is the extent to which their approaches can be assessed as demanding and possibly difficult to understand by other researchers. Among assumptions open for problematization, Alvesson and Sandberg (2011) mention: in-house assumptions (shared by advocates of a given school of thought, e.g. leadership conceptualized as a set of specific attributes – Yukl, 2006 as cited in Alvesson, Sandberg, 2011, p. 254); root metaphor assumptions (not limited to a particular school of thought but extended to broader images of a particular subject matter, e.g. organizations seen as "cultures" in terms of beliefs shared by organization members – Morgan, 1997 as cited in Alvesson, Sandberg, 2011, p. 255); paradigmatic assumptions (refer to ontological, epistemological and methodological assumptions that underlie given ideas, e.g. application of an interpretive approach to a problem previously not analyzed from such point of view – Sandberg, 2000 as cited in Alvesson, Sandberg, 2011, p. 255); ideology assumptions (refer to political assumptions, moral assumptions or gender-related assumptions; may involve formulating the same question in another way, e.g. researcher is interested in the reasons behind people motivation in a situation when people experience their work in a positive way – Sievers, 1986 as cited in Alvesson, Sandberg, 2011, p. 255); field assumptions (refer to a broader set of assumptions related to a given subject matter; in contrast to in-house assumptions these ones are shared by more than one school of thoughts or even across paradigms and disciplines, Alvesson, Sandberg, 2011, p. 256). What is also to be emphasized is that before one wants to develop alternative assumptions, one should identify, articulate, and evaluate assumptions of a selected domain (Alvesson, Sandberg, 2011, p. 256).<sup>1</sup> An example of applying problematization methodology to the organizational identity field of the research is the work done by Kreiner et al. (2015) who tried to problematize the literature based on a dialectical approach. Before their approach to problematization is to be analyzed (for a general discussion on the importance of the concept of the elasticity of organizational identity see Janiszewski, 2023a), some introduction to a dialectical approach is presented.

Although Mumby (2004) does not focus on organizational identity research, his approach to dialectical analysis turns out to be useful for organizational identity researchers as well. Mumby (2004) pays his attention to a dialectical approach wanting to emphasize that it is better to treat control and resistance as mutually constitutive and not through the prism of implicit dualism. This is because the latter approach leads to that there is a tendency among researchers to privilege either organizational control processes (here worker's resistance is to be interpreted as rather ineffectual when being analyzed from the point of view of its impact on transformation of everyday relations of power) or employee's resistance to mechanisms of control (here employee' efforts can be in someway "romanticized" [Mumby, 2004, p. 21] as organizational control efforts turn out to be forceless when being confronted with these efforts).

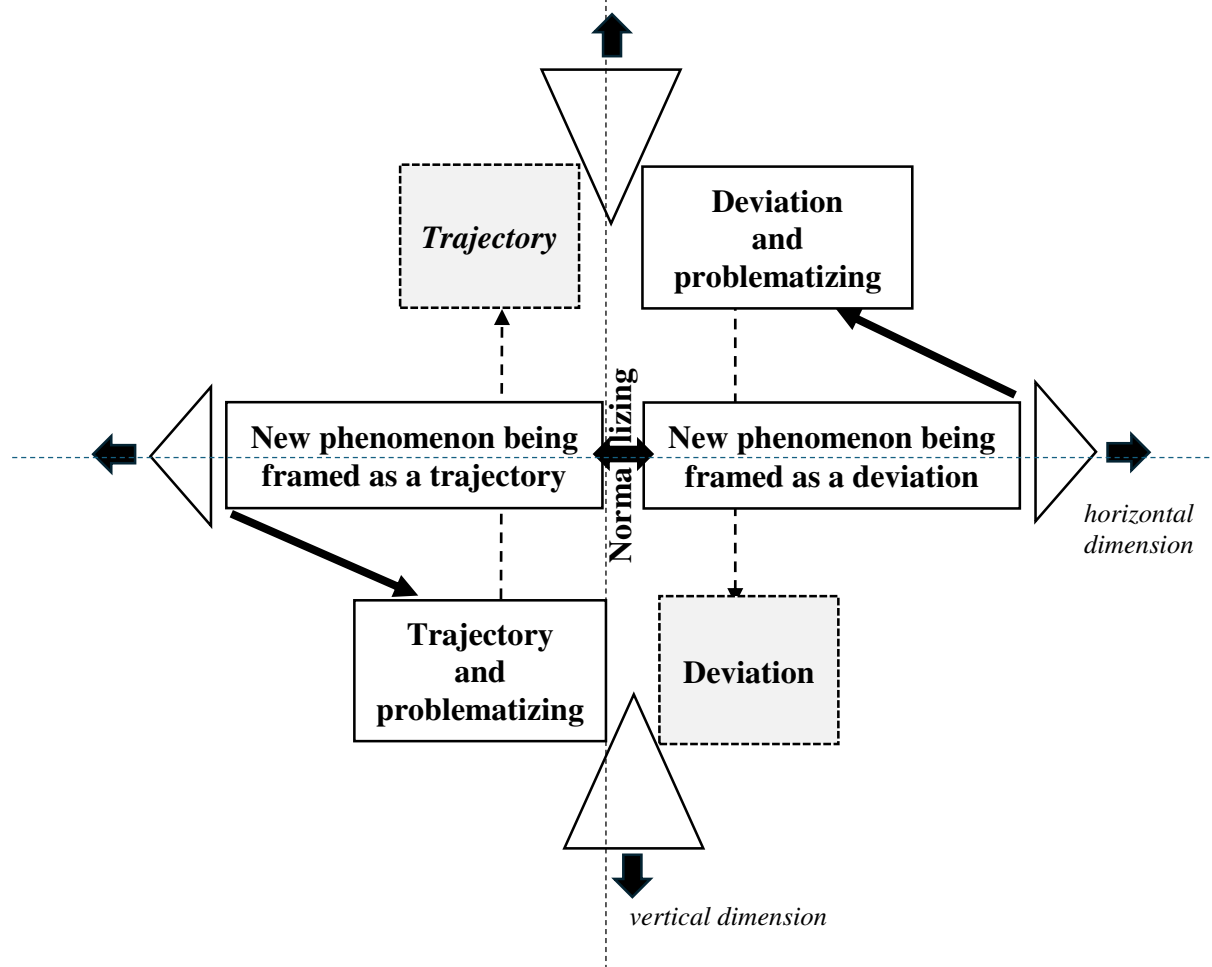
In addition to Adorno's negative dialectics (as being against grand synthesis - Adorno, 1973 as cited in Mumby, 2004, p. 22), when discussing his approach to dialectical analysis Mumby (2004) admits to being influenced by Benson's approach<sup>2</sup>. This approach emphasized the issue of dereification (Benson, 1977 as cited in Mumby, 2004, p. 38), which relates to the fact that each practice can be characterized to some extent as arbitrary. According to Mumby (2004) when wanting to catch the production of complex and possibly contradictory dynamics of control and resistance through their intersection, acts of both - obeisance to power and covert resistance to power – should be included. As presented by Mumby (2004) the main feature of a dialectical perspective applied to his field of research is that the dynamics of control and resistance are said to unfold under discursive conditions.<sup>3</sup> It would be interesting to think about this kind of assumption when thinking about a widely spread approach to organizational identity study in case of which “organizational identity is specified as the central and enduring attributes of an organization that distinguishes it from other organizations” (Whetten, 2006, p. 220).

When discussing the development of a dialectical approach Mumby (2004) emphasizes that some thinkers were in favor of looking for a resolution of contradictions and gaining transcendent knowledge (e.g. Lukács), while other thinkers argued that tensions and contradictions should be maintained because then critical reflection and praxis should be possible (e.g. Adorno)<sup>4</sup>. Here, it can be added that when discussing the relation between trust and control, in order to explain a duality perspective Möllering (2005) also compares it with framing trust and control as a dualism. According to him a task for researchers involves looking for "various connections between two distinct concepts" (Möllering, 2005, p. 284). By referring to philosophical debates, Möllering emphasizes that whereas thinking about humans having "a body on the one hand and a soul on the other" is in line with the definition of dualism, thinking about the body needing a soul and vice versa as a condition to be met to be human, is in line with a duality (Möllering, 2005, p. 284). From the point of view presented in the following considerations on organizational identity and identification, it could be emphasized that focusing too much on either side of conflicting views on how it is possible to perceive or categorize themselves as members of the organization (what is actually a common concern for researchers on organizational identity and identification - Ravasi, van Rekom, 2003), has to lead to the situation when the group of strongly disagreeing organizational members emerges. In order to avoid threatening the existence of the organization, another approach to dealing with contradictions is to be more suitable. This is described by Kreiner et al. (2015) whose views on dialectical approach are analyzed in the following paragraph.

### 3. Discussion

#### 3.1. Dialectical approach and the construct of organizational identity elasticity

In Kreiner et al.'s study (2015) the emphasis is put on identity elasticity, which refers to stretches and contractions of identity dualities. Opposite views formulated by organizational members are to be held even indefinitely in the tensions and they lead to those identity dualities. Those tensions are to produce the above-mentioned stretches that are unbalanced and unequal but persistent. According to this approach, for the organization to avoid being fragmented into new organizations or groups there is no necessity to resolve the disequilibrium, however, the disequilibrium "must be attended to creatively in an ongoing tension" (Kreiner et al., 2015, p. 994). What is interesting from the point of view of the current paper is Kreiner et al.'s discussion (2015) on the term *organizational identity elasticity* through the prism of dialectic tensions (including centrality dialectic, endurance dialectic, distinctiveness dialectic). Below in Figure 1 one of these tensions is analyzed as well as some further details as to how the dialectical approach can be used are given and interpreted.



**Figure 1.** Interpretation of identity elasticity concept based on endurance dialectic.

Source: Author's own based on Kreiner et al. (2015); Smith, Lewis (2011); Mumby (2004).

The presentation of the proposition on how the endurance dialectic may be interpreted is made regarding both Kreiner et al.'s notion (2015), which instead of being focused on the Hegelian synthetic view is focused on "negotiable interplay" among dualities (Kreiner et al., 2015, p. 994), and Smith and Lewis' proposition (2011) of dynamic equilibrium model. In the case of Smith and Lewis' model, the focus is on ensuring simultaneous attention to alternatives when remaining aware of the contradiction between alternatives and the need to have decisions frequently shifted. The need results from "purposeful iterations between alternatives" (Smith, Lewis, 2011, p. 392). Below there are some propositions related to how further conclusions about identity elasticity can be drawn when taking into consideration the above-mentioned views related to the "negotiable interplay" and dynamic equilibrium model.

To start with, it is good to say that when speaking about the traditional synthetic view of dialectics it is not possible to avoid solving conflicting issues in a way that leads to the increasing demand for an opposed force. Hence, when one is to assess whether something new that happens is a kind of continuation of the past or it should be seen as being impossible to couple to what was done successfully in the past, even when one attempts to synthesize opposing views, the final synthesis is to be based primarily on the first worldview or on the second worldview (like the worldview of trajectory in Figure 1 or the worldview of deviation in Figure 1, which means that the present situation may be viewed through the prism of continuity or discontinuity, respectively). That is why e.g. when the worldview of deviation begins to outweigh the second one and those organizational members who are in favor of this second one may feel that their voice is marginalized, the need to find the next solution emerges and the process of searching for this solution is to start. The whole cycle is to be repeated again and again. It can be assumed that problematization<sup>5</sup> can be a decisive factor here. Hence, it can be postulated that those changes in organizational identity which are described by the vertical dimension in Figure 1 are believed to lead potentially to the cease of the existence of the organization due to differences in how organizational identity is described and implemented by some of its members. This may turn out to be unacceptably framed from the point of view of other members (differences are expanding quickly in a way reflected by the base of the triangle in Figure 1)<sup>6</sup>. However, when the horizontal dimension is analyzed, then it can be seen that there are also some differences between organizational members' voices as to whether a given change is continuous or rather discontinuous, but final solutions could be different.

Firstly, the situation, when due to processes of normalizing the controversies about the change, it becomes more consistent with the current identity, can be analyzed. Then it may turn out to be possible in one moment to promote one solution but in a way that the second solution is not forgotten, i.e. reasons for the alternative solution are still being analyzed and the solution could possibly be implemented. Changes in organizational identity are possible because even if the organization finishes its preparations for the first scenario in a given moment and finally focuses on the second scenario, all hints resulting from a consideration of the first scenario are to influence how the second scenario will be realized. In addition to this, how the second



scenario is realized is to be included when analyzing again the reasons for the first scenario - only when convincing premises are to become visible can the rejected alternative be implemented. For example, negligence of CSR activities related to the strong technical orientation of the organization could result in an image crisis whereas investing primarily in CSR activities could question the main reason for the existence of the organization. Iterations between those alternatives when maintaining awareness of both of them are to lead to some changes in organizational identity. That is why it could be postulated that possible changes in organizational identity are to be less radical and to occur more slowly (differences are expanding in a way reflected by the apex of the triangle in Figure 1).

Secondly, the situation, when the change appears to be rather a discontinuous one and normalizing the controversies about the change tends to be difficult, can be analyzed as well. The issue is that it can be postulated that even when the change is discontinuous, a suitable approach to the problem adopted by organizational members may help to solve the issue without making the threat to the organization even more serious. Here, it can be assumed that a given change in addition to being perceived as a discontinuous one due to its character (e.g. the choice of whether to invest in a new field), can also be considered as threatening due to the difficulty related to the choice of the most important criteria for its assessment (including opinions of stakeholders). It means that not only the discontinuous character of the change can account for a kind of challenge (and this is the type of challenge on which identity elasticity appears to be focused), but the level of difficulty related to the process of making a choice may be important here as well.<sup>7</sup> What can be postulated is that processes of normalizing identity controversies involved in the social construction of organizational identity may facilitate an elastic stance toward organizational identity as Krainer et al. (2015) proposed. In addition to this, it appears that it may make it possible to alleviate tensions around the possible change of organizational identity when a new phenomenon is to be framed by a majority as a deviation. The core of the issue is that processes of normalizing controversies about the change tend to be viewed through the prism of considering the change as "consistent" with identity (Kreiner et al., 2015, p. 1001). It can be assumed that managers when initially inclined to think about the change as a deviation can agree that the choice is difficult. However, since choices made by the organization in the past can have something in common with the current difficult choice (e.g. the change may be perceived similarly by stakeholders) or it can be agreed among managers that those similarities may be achieved (e.g. by attempting to find common ground for decision together with stakeholders) managers do not have to close themselves off to accept some inconsistencies. Hence, normalizing the process of making a choice (and not parallelly to this normalizing the discontinuous character of the change as well) may lead to the prevention of the organization from intensifying challenges with which it needs to deal.

Kreiner et al. (2015) use the above-mentioned dialectic tensions approach to problematize (here in Alvesson and Sandberg's meaning of this term – as a methodology) assumptions related to a commonly known definition of organizational identity presented by Albert and Whetten (1985) and next discussed in greater detail by Whetten (2006). Organizational identity is specified then as “the central and enduring attributes of an organization that distinguishes it from other organizations” (Whetten, 2006, p. 220). The dimension of endurance is actually the one that is questioned more often to the extent that other researchers are inclined to even say that organizational identity is fluid (Gioia, Hamilton, 2016). The proposition presented in Figure 1 can be understood as an attempt to refer to this discussion and show that problematization applied by Kreiner et al. (2015) (again in Alvesson and Sandberg's meaning of this term - as a methodology) may prove to be useful widely. The core of the issue of the above-mentioned example is that when following a synthetic view on dialectic tensions it is not possible to focus only on framing a given phenomenon as a trajectory or a deviation from the past because the need for an alternative emerges. Hence, another solution proposed is not to focus on a definite choice but on dealing with tensions and paying attention to alternatives as they both are needed. This one was adopted by Kreiner et al. (2015) and a similar view can be found in Smith and Lewis' discussion (2011) on how different organizational tensions should be understood. Although not discussed directly by Kreiner et al. (2015) it may be proposed that organizational identity work regarding endurance of organizational identity and involving normalizing or problematizing (in the meaning of the term as simply making exceptional) controversies may be involved in explaining when and why it may not be the issue to look for definitive solutions to organizational problems as contradictory elements are to persist over time and may prove to be paradoxical. To sum up, it may be noticed that when discussing organizational identity and its elasticity, the mere existence of the concept of organizational identity is not challenged or its utility depending on the power position of different groups of stakeholders is not analyzed. That is why neither ideology assumptions nor field assumptions are under discussion.

Some additional issues can be noticed when referring to the outlined approach to a study conducted by Dutton and Dukerich (1991) in case of which it is possible to indicate some paradoxes (as defined by Smith, Lewis, 2011) as well. This study shows that not only does organizational identity enable organizational development and change, but also it may be an obstacle to it. The study can be interpreted as one showing how the increasing intersection of tensions between two organizational identities (professional organization and altruistic organization) involved organizational change when the salience of the change became unquestionable due to resource scarcity and attention paid by different groups of stakeholders. Taking account of key questions posed by Gioia and Hamilton (2016) when referring to grand debates in the field of organizational identity study, it might be noticed that some potentially significant references to the choice between perceiving organizational identity as a social construction process or perceiving it through the prism of social actor view can be made.

To give some more details, Dutton and Dukerich (1991) were interested in building a new view of organizational adaptation by focusing on how the Port Authority of New York and New Jersey in the 80s was dealing with the issue of the homeless people at its facilities. The year 1986 was a time when the approach of the Port Authority towards the problem of homelessness started to change. Before that time the necessity to deal with homeless people was treated as a “normal part of business” (Dutton, Dukerich, 1991, p. 528). It meant that the organization's contact with homeless people was limited to the police as a source for it. This approach actually may remind one described in Figure 1 as “normalizing”, which is also defined by Kreiner et al. (2015, p. 1001) as defining identity challenges by claiming “business as usual”. As it was postulated, this approach may alleviate tensions related to the process of the change of organizational identity and it may lead to significant steps to be made due to less fear of making a decision. However, due to dual organizational identity in this case (professional organization and altruistic organization), this process did not lead to changes aimed at improving the situation of homeless people. Although some factors in the organizational environment had an impact on that interpretation (e.g. the antiloitering law) they did not appear to be decisive. This was because some significant changes in the interpretation of the discussed issue appeared before the antiloitering law was repealed. Even the organizational patrons’ feeling of the lack of safety did not appear to influence the organization to introduce expected changes. It was not until the problem started to be visible at the main Port Authority facilities that the organization started to undertake limited actions to prevent the problem. On the one hand, some important external circumstances did not initiate the change. On the other hand, there were important internal requirements that had to be met before the change could be initiated. The changes that started to occur in the Port Authority required it to introduce the issue of the homeless to a budgeting process in the beginning. At the same time, the fact that homeless people started to appear at the main Port Authority facilities allowed the Port Authority to recognize that it did not have suitable procedures to deal with the problem. Hence, it could be noticed that the issue of the existence of suitable procedures at the bus terminal (it was the place where homeless people were present since the beginning) and the potential reluctance to start a process of preparing new procedures and routines was one but significant reason behind the slow process of changing the situation. Here, the impact of dual organizational identity (this issue is still emphasized as relevant for organizational identity research - Knorr, Hein-Pensel, 2024) as well as the impact of external or internal organizational factors on how the process of normalizing is to occur may emerge as fields of research investigation. In addition to this one question that may arise is what the main tension was in the example of the Port Authority. Possibly it could be one between the importance of the organization and its interpretation as a “high-quality organization” (Dutton, Dukerich, 1991, p. 526) and the issue of high visibility of the problem or one between employees’ sense of the Port Authority as “family” (Dutton, Dukerich, 1991, p. 527) and a lack of safety. In addition to this, the next possibility that emerges is the tension between the reluctance to prepare suitable

procedures and the existence of well-adopted ones. The question could also be whether a possibly important issue of procedures and routines could be attached to the line of thought, possibly present in Dutton and Dukerich's study (1991), which underestimates the importance of the part of daily social interactions. Those are important for the social construction approach to organizational identity. At the same time, the period of the study was described by Dutton and Dukerich (1991) as dominated by a new director who directly adopted the approach in line with which the Port Authority should not be a "social service business" (Dutton, Dukerich, 1991, p. 532). When taking into account this issue, it could be argued that organizational identity in this case was defined mainly by following the social actor view. In general, further analysis of those problems may focus on the issues of attribute-based and process-based views of organizational identity. Nevertheless, the issue of recognizing tensions and approaching them from a position free from ideological bias may appear to be mainly relevant for the opportunities to pose research questions related to organizational identity but less focused on organizational identity understood as "central and enduring attributes of an organization that distinguishes it from other organizations" (Whetten, 2006, p. 220).

### **3.2 Dialectical approach and organizational identification**

Drawing on a broad body of literature, Suddaby, Foster, and Trank (2016, p. 297) argue that organizational identification can have "critical importance" for organizations due to its potential to enhance an organization's relationship with different groups of actors. When emphasizing the importance of "elaborating the constituent elements of organizational identification" (Suddaby, Foster, Trank, 2016, p. 297), they also pay attention to that the identification can be understood as the process and then it is required that "ongoing management of perceptions of identity in the past, present, and future" occurs (Suddaby, Foster, Trank, 2016, p. 298). Not questioning that the kind of affiliation between organizational members and their organizations needs to be constructed over time, the considerations presented in this paragraph are to be focused primarily on discussing what insights can be derived from viewing organizational identification as a state that is impacted by different aspects of the organizational life. When combining the approach presented by Kreiner et al. (2015) with some additional insights presented especially by Mumby (2004), it becomes possible to show how Alvesson and Sandberg's discussion (2011) related to Dutton, Dukerich, and Harquill's (1994) study can be developed. Dutton, Dukerich, and Harquill (1994) built the model according to which key organizational images (these are both images based on what according to the organizational member is distinctive, central, and enduring about the organization and images based on beliefs presented by organizational members as to what outsiders think about the organization) may shape the strength of organizational members' identification with the organization. Here organizational identification is understood as the cognitive connection that is created when "a person's self-concept contains the same attributes as those in the perceived organizational identity" (Dutton, Dukerich, and Harquill, 1994, p. 239). Among others, it is proposed that the

better a given image is in preserving the continuity of members' self-concept, providing distinctiveness, and enhancing members' self-esteem, the higher its attractiveness for organizational members is. Due to those features of images, it appears to be possible to postulate about their impact on the strength of members' organizational identification. When applying the methodology of problematization to Dutton, Dukerich, and Harquail's (1994) study, Alvesson and Sandberg (2011) pay attention to the fact that e.g. Dutton, Dukerich, and Harquail (1994) explained the term "perceived organizational identity", which they introduced, by referring to statements which are aimed at conceptualizing their subject matter related to member identification and not at "highlighting" (Alvesson and Sandberg, 2011, p. 261) assumptions based on which Dutton, Dukerich, and Harquail (1994) are to build their argument. Whereas attempts at discussing assumptions about a given subject matter (like in the case of Simon's bounded rationality concept that challenged assumptions of rational decision makers – Alvesson, Sandberg, 2011, p. 255) may open opportunities to ask new questions regarding even field assumptions, what Dutton, Dukerich, and Harquail (1994) argue about the attributes of the organization and members' beliefs about them is itself underpinned "by a range of assumptions" (Alvesson, Sandberg, 2011, p. 261). Hence, the question of whether those arguments could be "productive" (Alvesson, Sandberg, 2011, p. 261) may be posed.

To emphasize a few further issues related to Dutton, Dukerich, and Harquail's (1994) study, which were outlined by Alvesson and Sandberg (2011), it is needed to pay attention to the use of dualist ontological assumption and next to the claim that, in general, existing independently individuals and organizations should be constituted by a set of attributes (inherent and characterized by at least some stability). The other important issue also relates to whether it should be allowed to assume that the organization as a whole is all the time the same thing about which its members could have beliefs (related e.g. to its enduring attributes) or even whether, taking into account modern capitalism, lasting relationships with organizations are existing at all (Alvesson, Sandberg, 2011, pp. 261-263). Following the above-mentioned argumentation and attempting to show some possible next insights, at the beginning it may be noticed that for Dutton, Dukerich, and Harquail (1994) the strength of organizational identification means that different organizational members perceive their characteristics as being to a large extent the same as those that define their organization. What is more, the identity of a given organizational member is more salient than alternative identities (Dutton, Dukerich, Harquail, 1994). Nevertheless, some problems with such conceptualization may arise. When researching trust-control relationships in creative organizations (that is conductorless orchestra), Khodyakov (2007) proved that due to the intricacy of trust-control relationships, the duality theory should be chosen to explain this relationship. Treating trust and control as a duality means here that they cannot be analyzed in isolation due to their co-presence. Referring to the previously mentioned Möllering (2005), on the one hand, Khodyakov (2007) argues that trust and control create each other. But on the other hand, they still become "irreducible to one another" (Khodyakov, 2007, p. 2). Here it turns out that both trust and

control should be required for successful performance. However, there are no direct control strategies used. Instead, other forms of control are used, these are behavioral, input, output, and social control. As a result of this, the line between trust and control is blurred. But even in the case of the relationship between trust and social control, trust is not to be reduced to social control because it would not be sufficient for the orchestra to operate only under the assumption that each musician, when being socialized into a specific organizational culture, can “adequately control his or her behavior” (Khodyakov, 2007, p. 17). At the same time, the orchestra is said to achieve optimal distinctiveness through the reliance on trust and control that are “intricately intertwined” (Khodyakov, 2007, p. 3). This intersection of uniqueness (based on artistic dimension) and organizational competitiveness achieved by this organization may lead to the question of whether the issue of possible organizational identification (understood as the “cognitive connections between the definition of an organization and the definition a person applies to him - or herself” - Dutton, Dukerich and Harquail, 1994, p. 242) in such circumstances still could play a crucial role for organizational members or more relevant bases for good performance, can be investigated. The issue is that when it is possible that organizational members do not perceive themselves from the point of view of the traits of the whole organization (Alvesson, Sandberg, 2011), relationships that occur at a different level of analysis may prove to explain a good organizational performance in a better way. Although Dutton, Dukerich, and Harquail (1994) admit that because individual-organizational attachment appears to be more than an intrapersonal phenomenon, cognitive attachment to some extent can be considered a “social and interpersonal process” (Dutton, Dukerich, and Harquail, 1994, p. 257), by building their proposition they appear not to take into consideration that spaces, in which stable and robust degree of perceived similarity between individual and organization can be established, can be “rare” (Alvesson, Sandberg, 2011, p. 263). Then it appears that more process-sensitive approaches could be more relevant. What can also be emphasized, when one does not apply a duality approach, then elements in case of which “each assume the existence of the other” (Möller, 2005, p. 284) may be treated as separate routes to a given aim, and then what can be implied is only e.g. “a potential relationship between trust and control” (Möllering, 2005, p. 299; Khodyakov, 2007). The duality perspective in this sense makes it possible to become aware of control elements in strong trust relationships or, conversely, those relationships that appeared to be strictly controlled could reveal their trust elements (Möllering, 2005). Hence, it is not possible to explain one without the other in a complete way. Khodyakov's research (2007) shows that the use of the perspective based on the assumption of the mutual constitution of constructs can bring about opportunities to develop new ideas. For example, although the paper presented by Khodyakov (2007) does not relate directly to the issue of organizational identification, it describes one important interpersonal characteristic (that is civility) that should help give a good performance by the orchestra without a conductor. The core of the matter is that when disagreeing with other musicians, the person who disagrees is expected to express this fact in such a way as to avoid offending colleagues. Otherwise,

the development of trust would not be possible in such a case. The issue of whether e.g. a high level of trust among organizational members (and not social control) can make it possible to pursue good performance also under circumstances of weakening organizational identification due to personal matters may provide researchers with an opportunity to formulate the next research questions. For example, the question can be related to whether it is possible to find sufficiently strong common reasons for organizational identification among members who trust themselves to the extent that the level of trust implies that some level of organizational identification is to be always maintained. Alternatively, can those common reasons for organizational identification support trust relationships to the extent that these relationships are not to be destroyed due to some external difficulties? What is more, although it may not be possible now to settle the discussion related to how organizational identification should be defined, arguments for treating it rather through the prism of congruence among values held by members and their organizations (e.g. Lee, 1971) may be justified when approaching issues of organizational identification related to creative organizations. Hence, it may be that insights from other fields of research may encourage researchers to rethink how they are to define their constructs and whether assumptions necessary for relationships among them to be relevant are those on which they are to be focused most.

#### **4. Conclusions**

The paper focused on how problematization within the literature domain of organizational identity and identification can encourage researchers to pose research questions that potentially may be relevant to the audience. What should be emphasized, more radical propositions on how the construct of organizational identity could be redefined were not discussed. Due to the approach involved when problematizing the selected domain of literature, examples of the modern dialectical approach and the applications of the theory of paradox proved to be useful tools. On the one hand, the examples shown in the paper were focused on discussing how the construct of organizational identity was challenged in the literature by the use of dialectics tensions (Kreiner et al., 2015) as well as on how this argumentation can be used when attempting to ask further questions in the field of attributes important from the point of view of organizational identity studies. On the other hand, some attention was paid to the issues of problematizing (in the sense of exacerbating) or normalizing (in the sense of taking as usual) challenges resulting from relaxing assumptions related to the endurance of organizational identity. Some propositions as to how the understanding of both terms (i.e. problematizing and normalizing) can be developed were included. Also, it was discussed how investigation of similar approaches from other research fields may provide researchers with the opportunities to look for questions related to the issues mentioned by Ravasi and van Rekom (2003) as the most

important from the point of view of the field of study investigated in the paper. Here, a need for careful choices of different types of assumptions was postulated to be of primary importance before propositions concerning relationships between new constructs can be built.

## References

1. Alvesson, M., Sandberg, J. (2011). Generating Research Questions through Problematization. *Academy of Management Review*, Vol. 36, No. 2, pp. 247-271, doi: 10.5465/amr.2009.0188.
2. Benson, J.K. (1977). Organizations: A dialectic view. *Administrative Science Quarterly*, Vol. 22, pp. 1-21, doi: 10.2307/2391741.
3. Brewer, M.B. (1991). The Social Self: On Being the Same and Different at the Same Time. *Personality and Social Psychology Bulletin*, Vol. 17, Iss. 5, pp. 475-482, doi: 10.1177/0146167291175001.
4. Caprar, D.V., Walker, B.W., Ashforth, B.E. (2022). The Dark Side Of Strong Identification In Organizations: A Conceptual Review. *Academy of Management Annals*, Vol. 16, No. 2, pp. 759-805, doi: 10.5465/annals.2020.0338.
5. Dutton J., Dukerich, J., Harquail, C. (1994). Organizational images and member identification. *Administrative Science Quarterly*, Vol. 39, Iss. 2, pp. 239-263, doi: 10.2307/2393235.
6. Dutton, J.E., Dukerich, J.M. (1991), Keeping An Eye On The Mirror: Image And Identity In Organizational Adaptation. *Academy of Management Journal*, Vol. 34. No. 3, pp. 517-554, doi: 10.2307/256405.
7. Gioia, D.A., Hamilton, A.L. (2016). Great Debates in Organizational Identity Study. In: M.G. Pratt, M. Schultz, B.E. Ashforth, D. Ravasi (Eds.), *The Oxford Handbook of Organizational Identity* (pp. 21-38). Oxford: Oxford University Press.
8. Janiszewski A. (2023b). Zarządzanie komunikacją organizacyjną w świetle krytycznego spojrzenia na kontrolę organizacyjną. *Zeszyty Naukowe Akademii Górnośląskiej*, nr 5, pp 29-47, doi: 10.53259/2023.5.04.
9. Janiszewski, A. (2023a). Shaping Organizational Identity in the Light Of Legitimacy Challenges – Conceptual Framework. *Scientific Papers of Silesian University of Technology, Organization and Management Series*, No. 150, pp. 29-46. Gliwice: Silesian University of Technology in Publishing House, doi: 10.29119/1641-3466.2023.177.14.
10. Khodyakov D.M. (2007), The Complexity of Trust-Control Relationships in Creative Organizations: Insights From a Qualitative Analysis of a Conductorless Orchestra. *Social forces*, Vol. 86, No. 1, pp. 1-21, doi: 10.1353/sof.2007.0100.



11. Knorr, K., Hein-Pensel, F. (2024), Since Albert and Whetten: The dissemination of Albert and Whetten's conceptualization of organizational identity. *Management Review Quarterly*, Vol. 74, pp. 597-625, doi: 10.1007/s11301-022-00311-7.
12. Kreiner, G.E., Hollensbe, E., Sheep, M.L., Smith, B.R., Kataria, N. (2015). Elasticity and the Dialectic Tensions of Organizational Identity: How Can We Hold Together While We Are Pulling Apart? *Academy of Management Journal*, Vol. 58, Iss. 4, pp. 981-1011, doi: 10.5465/amj.2012.0462.
13. Lee, M.S. (1971). An Empirical Analysis of Organizational Identification. *Academy of Management Journal*, Vol. 14, Iss. 2, pp. 213-226, doi: 10.2307/255308.
14. Lenart-Gansiniec, R. (2021). *Systematyczny przegląd literatury w naukach społecznych. Przewodnik dla studentów, doktorantów i nie tylko*. Warszawa: Scholar, p. 284.
15. McKinley, W., Mone, M.A., Moon, G. (1999). Determinants and Development of Schools in Organization Theory. *Academy of Management Review*, Vol. 24, Iss. 4, pp. 634-648, doi: 10.5465/AMR.1999.2553245.
16. Möllering, G. (2005). The Trust/Control Duality. *International Sociology*, Vol. 20, Iss. 3, pp. 283-305, doi: 10.1177/0268580905055478.
17. Mumby, D.K. (2004). Theorizing resistance in organization studies: A dialectical approach. *Management Communication Quarterly*, Vol. 19, No. 1, pp. 19-44, doi: 10.1177/0893318905276558.
18. Ravasi, D., van Rekom, J. (2003). Key Issues in Organizational Identity and Identification Theory. *Corporate Reputation Review*, Vol. 6, No. 2, pp. 118-132, doi: 10.1057/palgrave.crr.1540194.
19. Smith, W.K., Lewis, M.W. (2011). Toward A Theory Of Paradox: A Dynamic Equilibrium Model Of Organizing. *Academy of Management Review*, Vol. 36, No. 2, pp. 381-403, doi: 10.5465/amr.2009.0223.
20. Suddaby, R., Foster, W.M., Trank, Ch.Q. (2016). Re-Membering: Rhetorical History as Identity Work. In: M.G. Pratt, M. Schultz, B.E. Ashforth, D. Ravasi (Eds.), *The Oxford Handbook of Organizational Identity* (pp. 297-316). Oxford: Oxford University Press.
21. Whetten, D.A. (2006). Albert and Whetten Revisited. Strengthening the Concept of Organizational Identity. *Journal Of Management Inquiry*, Vol. 15, No. 3, pp. 219-234, doi: 10.1177/1056492606291200.

### Footnotes

<sup>1</sup> Generally, the procedure outlined by Alvesson and Sandberg (2011) is comprised of six steps (starting from a step involving identifying a domain of literature for assumption-challenging investigations to step six involving evaluating the alternative assumption ground. Due to the space limit, they are not to be discussed in detail here.

- <sup>2</sup> Benson (1977) in his paper on a dialectical approach to the study of organizations presented four principles of dialectical analysis which were believed to guide “a dialectical view of any particular field of study” (Benson, 1977, p. 3). These were social construction/production, totality, contradiction, and praxis (Benson, 1977). In general, praxis can be understood as a mechanism of agency whose important aspect is the assumption that people, under certain conditions, can become active agents reconstructing their social relationships and ultimately themselves based on rational analysis (Benson, 1977, pp. 5-6).
- <sup>3</sup> What is important, such an assumption does not imply that the phenomenon described by the control-resistance dynamic is said to be a purely discursive one. Here both discursive and material forms of organizational behavior are to be understood through the frame of discourse. Because organizational behavior may be subjected to competing efforts aimed at shaping and fixing its meaning, a dialectical approach may be focused on the struggles of different groups with meaning systems that are believed to be constitutive of daily life in organizations (Mumby, 2004).
- <sup>4</sup> For a more detailed discussion on Frankfurt school see Janiszewski, 2023b.
- <sup>5</sup> The meaning of the problematization used in the context of Kreiner et al.’s (2015) research is not only one that is aligned with the meaning used in Alvesson and Sandberg’s (2011) paper. For Kreiner et al. (2015, p. 1001) and in the context of the description of their dialectics, when one problematizes something then one treats something as “exceptional”.
- <sup>6</sup> Other possibilities included in Figure 1, which combines trajectory and problematizing, may need additional explanations. Processes of problematizing identity controversies may facilitate an inelastic stance toward organizational identity as Krainer et al. (2015) proposed. In addition to this, it appears that they may make it possible to accelerate the change of organizational identity when a new phenomenon is to be framed by a majority as a trajectory. The core of the issue is that processes of problematizing controversies about the change tend to be viewed through the prism of considering the change as "exceptional" (Kreiner et al., 2015, p. 1001). It can be assumed that managers when initially inclined to think about the change as a trajectory can agree that the choice related to how the change should be understood is not difficult because the change can be considered as a continuous one. However, e.g. because similar choices (resulting from e.g. ingroup bias and strong and exclusive identification - Caprar, Walker, Ashforth, 2022) made by the organization in the past led to disappointing results and due to concerns related to long-term perspectives, managers can start looking for inconsistent solutions to the choice problem and this is how processes of problematizing can emerge.
- <sup>7</sup> Of course, here a discussion can emerge whether the change that is to be assessed as discontinuous can have “other” criteria for the assessment. Following Krainer et al.’s logic (2015), it can be said that these criteria may refer to what attitude toward the change stakeholders may have. For example, from the point of view of managers, investing in a given new field may be a continuous change and the attitude toward this change on the part of stakeholders may be positive. The next investment may be interpreted by managers as a discontinuous change, however, stakeholders may have positive or negative attitudes toward it. In the first case, the criteria for making this decision can be more similar to those considered by managers during the first investment. In the latter case, those criteria are less similar to those included in the past. Hence, considering the level of difficulty related to the process of making a choice as being possible to be differentiated in case of a discontinuous change can be justified.

## AN APPROACH FOR SOLVING DIFFICULT SCHEDULING PROBLEMS

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**Purpose:** The paper explores the integration of population-based methods and parallel processing techniques, particularly leveraging Apache Spark, for optimizing scheduling problems in real-world scenarios.

**Design/methodology/approach:** Diverse population-based strategies and various improvement algorithms showcase adaptability and scalability in handling several scheduling problems.

**Findings:** The approach is validated by computational experiments, proving its efficiency and scalability.

**Research limitations/implications:** Future research may include finding more effective improvement algorithms, and applying machine learning techniques for managing and controlling strategies, that are used for exploration and intensification of the feasible solution space.

**Originality/value:** The techniques outlined in the paper indicate promising directions for further study and development.

**Keywords:** scheduling, optimization, population-based methods, parallelisation.

**Category of the paper:** Research Paper.

### 1. Introduction

Combinatorial optimization problems play a crucial role in various fields, ranging from operations research and logistics to computer science and artificial intelligence. The essence of these problems lies in the search for an optimal solution from a finite set of possible solutions, where the feasible solutions form a discrete combinatorial structure. However, the inherent complexity and difficulty of these problems pose significant challenges for efficient solution methodologies.

Many combinatorial optimization problems, such as various scheduling problems (SP), the traveling salesman problem (TSP) and the knapsack problem, belong to the NP class. The difficulty in finding an optimal solution grows exponentially with the size of the input, making these problems computationally challenging. Some combinatorial optimization problems are even more challenging and fall into the category of NP-hard problems. These are problems for which no known polynomial-time algorithm exists unless P equals NP. NP-complete problems are a subset of NP-hard problems, and if a polynomial-time algorithm exists for any NP-complete problem, it implies a polynomial-time algorithm for all problems in NP.

The concept of NP-hardness and NP-completeness provides a theoretical framework for understanding the inherent difficulty of certain optimization problems. While algorithms exist for solving specific instances of these problems, finding a general solution algorithm remains an open challenge.

Given the computational intractability of many combinatorial optimization problems, researchers often resort to heuristic and approximation algorithms. Heuristics are rule-of-thumb strategies that may not guarantee an optimal solution but aim to find a good solution within a reasonable amount of time. Approximation algorithms provide solutions that are guaranteed to be close to the optimal solution, often with a known bound on the solution quality.

Combinatorial optimization problems exhibit a rich tapestry of complexity, with many problems residing in the realm of NP-hardness and NP-completeness. The development of efficient algorithms for solving these problems remains an active area of research, fueled by advancements in computational techniques, and algorithmic design. As technology continues to evolve, the quest for tackling the complexity and difficulty of combinatorial optimization problems persists, driving innovation and progress in optimization theory and practice.

The No Free Lunch Theorem, introduced by David Wolpert and William Macready in 1997 (Wolpert, Macready, 1997), is a powerful concept in the field of optimization. In essence, it states that no optimization algorithm can outperform random search over all possible optimization problems. This theorem challenges the notion of a one-size-fits-all algorithm and emphasizes the importance of tailoring optimization approaches to the specific characteristics of a problem. The theorem suggests that there is no universal algorithm that excels across all combinatorial optimization problems. Each problem has its own unique structure, and a successful optimization algorithm must exploit this structure to be effective. Therefore, understanding the characteristics of the problem at hand becomes paramount.

To navigate the challenges posed by the No Free Lunch Theorem, researchers and practitioners in combinatorial optimization have increasingly turned to customization and problem-specific knowledge. Rather than relying on generic algorithms, tailoring optimization approaches to the specific structure and constraints of a given problem is key.

This paper presents an exploration of optimizing scheduling problems in real-world contexts through the integration of population-based methods and parallel processing techniques utilizing Apache Spark environment. It investigates various approaches such as metaheuristic algorithms, problem-specific heuristics, and hybrid methods that combine different optimization techniques for solving some computationally hard scheduling problems. To obtain satisfactory results one needs approaches offering scalability, adaptability, parallelization, and capability of learning and evolving over time. The originality of this paper relies on designing and validating original software framework applied for solving different scheduling problems. We believe that by tackling scheduling problems one would arrive at ideas helpful for solving a variety of the combinatorial optimization problems.

The rest of the paper is organized as follows. In Section 2 a brief description of scheduling problems is given and two techniques are discussed – population-based optimization and solution space search parallelization. Section 3 describes three computationally difficult scheduling problems subsequently used as the test-bed for computational experiment. Section 4 describes the proposed parallelized population-based approach. Section 5 contains details of the proposed implementation for solving the test-bed problems. Section 6 describes computational experiment and its results. Finally, Section 7 contains conclusions and ideas for future research.

## **2. Literature Review**

### **2.1. Scheduling**

Scheduling problems are ubiquitous and critical across numerous industries and domains. They represent a broad class of optimization problems that involve assigning resources to activities over time, typically with the goal of optimizing one or more objectives such as minimizing total duration, maximizing efficiency, or balancing resource utilization. These problems are found in manufacturing, logistics, healthcare, project management, and many other sectors.

Diverse applications include:

- **Manufacturing:** In manufacturing, scheduling problems such as the Job Shop Scheduling Problem (JSSP) or the Flexible Job Shop Scheduling Problem (FJSSP) are vital. Efficient scheduling ensures optimal machine utilization, reduces waiting times, and accelerates product delivery, directly impacting production costs and customer satisfaction.

- **Project Management:** In project management, the Resource-Constrained Project Scheduling Problem (RCPSp) and its modifications such as the Multi-Skill Resource-Constrained Project Scheduling Problem (MS-RCPSp) are considered. They entail assigning resources to tasks while adhering to various constraints that restrict resource allocation. Effective scheduling is crucial for timely project completion, optimal resource utilization, and cost management.
- **Healthcare:** In healthcare, scheduling involves staff rostering, patient appointment systems, and operating room management. Effective scheduling is essential for patient care quality, reducing wait times, and maximizing healthcare provider efficiency.
- **Transportation and Logistics:** Scheduling is key in transportation for route planning and fleet management. It ensures timely deliveries, optimizes fuel consumption, and improves service quality. In logistics, scheduling affects warehouse operations, loading/unloading activities, and distribution strategies.
- **IT and Computing:** In the realm of IT, task scheduling in distributed and cloud computing environments is critical for balancing loads, optimizing computational resources, and reducing latency.

Efficient scheduling leads to cost savings, enhanced productivity, better service quality, and improved overall operational efficiency. In industries like manufacturing and transportation, it directly influences profitability and competitiveness. In social contexts, such as healthcare and public services, it significantly impacts service accessibility and quality.

The importance of solving various scheduling problems cannot be overstated. They are pivotal in optimizing operations, enhancing service quality, reducing costs, and improving overall efficiency in diverse sectors. However these problems are also NP-hard, meaning they are computationally intensive and challenging to solve, especially for large-scale instances. Therefore, as essential tools in solving complex scheduling problems, scalable and flexible metaheuristics have emerged, that balance between exploration and exploitation to find near-optimal solutions in reasonable time frames.

Popular metaheuristics for scheduling include:

- **Genetic Algorithms (GA)** (Sampson, 1976; Wu et al., 2004; Squires et al., 2022; Ajmal et al., 2021): Mimic the process of natural selection, effectively used in job scheduling and resource allocation.
- **Simulated Annealing (SA)** (Kirkpatrick et al., 1983; Elmohamed, Saleh, 1998; Dalila et al., 2023; Lin et al., 2021): Inspired by the annealing process in metallurgy, useful in solving job shop and flow shop scheduling problems.
- **Tabu Search (TS)** (Glover, Laguna, 1999; Amico, Trubian, 1993; Mathlouthi et al., 2021; Vela et al., 2020): Uses memory-based strategies to avoid cycling back to previously explored solutions, effective in complex scheduling environments.

- Ant Colony Optimization (ACO) (Dorigo, Di Caro, 1999; Rajendran, Ziegler, 2004; Yi et al., 2020) and Particle Swarm Optimization (PSO) (Kennedy, Eberhart, 1995; Wang et al., 2018; Dalila et al., 2023; Pradhan et al., 2022): Inspired by the behavior of ants and flocks of birds, respectively, these are used for their robustness in various scheduling problems.

The application of metaheuristics in solving scheduling problems is driven by the need to find high-quality solutions within a reasonable time frame, especially for problems that are too complex for classical optimization methods.

## 2.2. Population-based Methods and Parallelisation

Apart of the choice of metaheuristics used to solve a scheduling problem, the efficiency of searching for solutions may be improved by using population-based methods to expand the search space and applying parallelism to speed up the search process.

Population-based methods offer significant advantages in solving various optimization problems (Jędrzejowicz, 2020). The methods operate on a set of potential solutions (a population of solutions) simultaneously. They excel in exploring large solution spaces, handling complex constraints, and providing a balanced approach to both exploring new solution areas and exploiting known good solutions. The adaptability and scalability of these methods make them particularly suited for the dynamic and often computationally intensive nature of scheduling problems.

Parallelisation represents a significant advancement in metaheuristics (Alba et al., 2013; Coelho, Silva, 2021) and it improves the search in the following aspects:

- Handling large solution spaces: Many scheduling problems involve vast search spaces that are computationally intensive to explore. Parallelism allows simultaneous exploration of different regions of the solution space, significantly speeding up the search process.
- Improving solution quality and diversity: Parallel metaheuristics can work on multiple solutions concurrently, increasing the diversity of the solution pool. This diversity helps in avoiding local optima and improves the overall quality of the solution.
- Reducing computational time: One of the primary benefits of parallelism is the reduction in computational time. This is crucial for time-sensitive applications where quick decision-making is essential.
- Scalability: parallelism enhances the scalability of metaheuristics, enabling them to effectively solve larger and more complex scheduling problems that would be infeasible with sequential methods.

To solve scheduling problems described in this paper both population-based methods and parallelisation is used.

### 2.2.1. *Integration of Apache Spark in Metaheuristics*

Apache Spark (Apache Spark, 2024), a powerful open-source distributed computing platform supports the way parallelism is introduced in metaheuristics. Its ability to process large-scale data across clusters of computers efficiently makes it particularly suitable for enhancing metaheuristic algorithms, which are often computationally intensive and data-heavy. Spark provides an accessible and scalable framework for deploying metaheuristics across multiple nodes, allowing for simultaneous exploration of the solution space and faster convergence to optimal solutions.

Spark's primary strength lies in its distributed computing capability, enabling the partitioning of tasks across multiple nodes and facilitating in this way the implementation of parallel versions of algorithms, where multiple subpopulations evolve in parallel. Moreover, Spark's capability to handle large datasets seamlessly integrates with the data-intensive nature of many optimisation problems, enabling more effective and efficient data processing and analysis.

The synergy between Spark and metaheuristics drives significant advancements in solving some of the most challenging problems in various domains (Lu et al., 2020; Aljame et al., 2020).

## 3. Test-bed Problems

In this paper, the integration of Apache Spark with population-based metaheuristics is outlined to effectively parallelize the search for solutions in scheduling processes. To illustrate this integration, three well-known NP-hard problems are selected:

- **Job Shop Scheduling Problem (JSSP).** The Job Shop Scheduling Problem is a classic optimization problem in production and operations management. It involves scheduling a number of jobs on a set of machines. Each job consists of a specific sequence of operations, each of which must be processed on a specific machine for a certain period of time. The objective is to minimize the total time required to complete all jobs (known as the makespan). The challenge arises from the constraints: each machine can only handle one operation at a time, and once an operation starts, it must run to completion without interruption.

The problem was addressed in (Belmamoune et al., 2022; Wei et al., 2022; Shieh et al., 2022; Jędrzejowicz Wierzbowska, 2023), each of these papers also contains the formal definition of the problem.

- **Flexible Job Shop Scheduling Problem (FJSP).** The Flexible Job Shop Scheduling Problem is a more complex variant of the traditional Job Shop Scheduling Problem. In FJSP, each operation of a job can be processed on more than one machine, adding an additional layer of complexity. The primary goal remains the minimization of the



total time to complete all jobs (makespan). This flexibility in machine assignment introduces additional decision-making dimensions, as it requires determining not only the sequence of operations for each job but also the optimal machine assignment for each operation.

The problem was formally described and examined in (Han, Yang, 2021; Jiang, Zhang, 2018; Nouri et al., 2017, Jedrzejowicz, Wierzbowska, 2022).

- **Multi-Skill Resource-Constrained Project Scheduling Problem (MS-RCPSP).** The Multi-Skill Resource-Constrained Project Scheduling Problem is a complex scheduling problem that involves assigning renewable resources with varied skill sets to specific tasks in a project. Each resource represents human staff and possesses a cost rate and a unique combination of skills. Each task requires a specific set of skills to be completed. The goal is to optimize the project schedule by minimizing the total project duration, while adhering to resource availability, skill requirements and precedence constraints. This problem is challenging due to the intricate balance required between resource allocation, skill matching, and schedule optimization.

The MS-RCPSP was proposed in (Bellenguez, Néron, 2005) and its formal definition can be found in (Bellenguez, Néron, 2005; Myszkowski et al., 2015; Myszkowski et al., 2019).

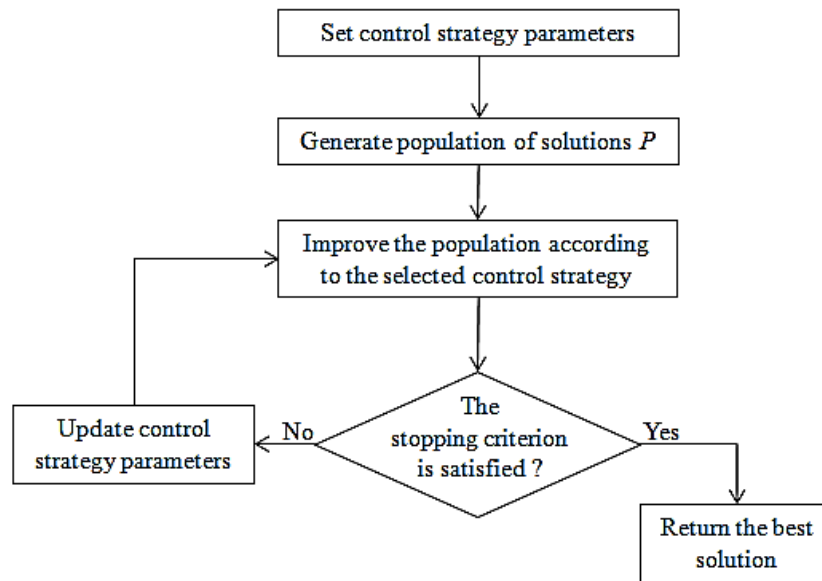
## 4. Proposed Parallelized Population-based Approach

The approach applied in this study is population-based system which uses parallelisation offered by Apache Spark.

### 4.1. System architecture

The system presented in this paper uses a population of individuals that represent solutions to the given scheduling problem. After the initial population of solutions is generated (at random or with the use of a number of heuristics), the solutions are improved by optimization heuristic algorithms. These algorithms are internal optimizing programs and are known as optimizing agents. Typically, a set of several agents is defined, with each one improving the solution in a different way.

The optimizing agents receive solutions from the population, enhance them, and reintegrate them into the population until the stopping criterion is met. The procedure varies across different problems and approaches. It is referred to as a control strategy. The overall system architecture is outlined in Figure 1.



**Figure 1.** Proposed system architecture schema.

Source: own study.

In the case of JSSP and FJSP problems the stopping criterion depends on the value of the objective function of the best solution in the whole population of solutions, if the value remains unchanged for a predefined number of consecutive cycles the process ends.

In the case of MS-RCPSP the average diversity in the population and the maximal number of scheduling generation schemas (SGS) procedure calls are used as the stopping criterion. An individual is represented by the sequence of activities with resources assigned. To generate a solution from the sequence, the SGS is most often used. Computations are stopped when the average diversity in the population is less than a fixed value or the number of SGS procedure calls is greater than a predefined number.

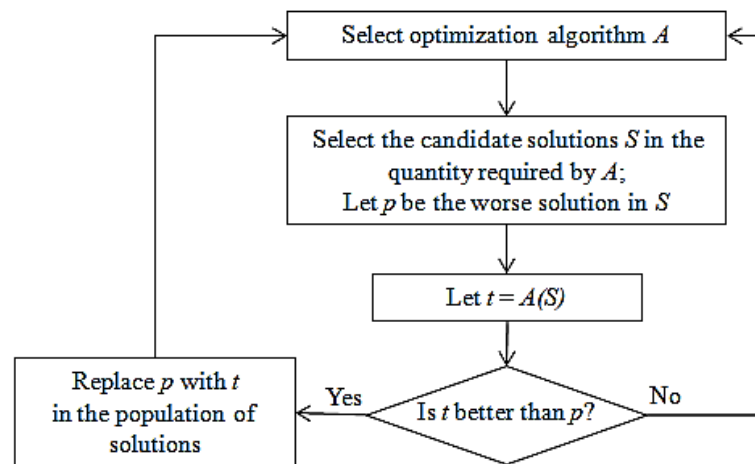
There are many control strategies and successful implementation may define these strategies in different ways. The expected result of any strategy that is used in the process is to obtain a population that over time contains better and better solutions. The crucial aspect of defining a strategy is utilisation of parallelism in execution of changes to the population.

## 4.2. Control strategies

The control strategies are responsible for optimization of the solutions in the population. A variety of strategies may be defined and used in the system, differing in their approach to selecting solutions, choosing heuristics for their improvement, or merging improved solutions with the population. In this study two different strategies are used.

The first strategy – SSIA (strategy based on simple improvement agents) - uses optimizing agents with relatively simple internal algorithms: they improve solutions by making a simple adjustment on the solution. Upon successful improvement, the refined solution is reintroduced back into the population, replacing the least effective solution that was initially drawn from it. The complexity of each such algorithm is very low and in one cycle of improvements hundreds

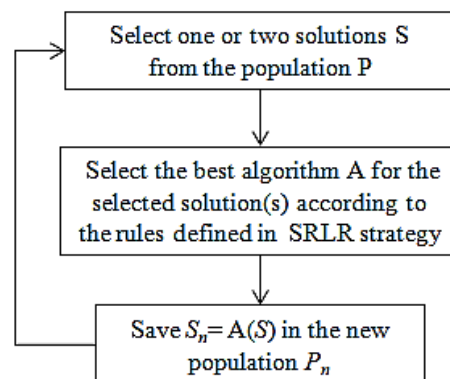
or thousands such algorithms may be run. A single step of SSIA is shown in Figure 2. A predefined number of such steps is run in one cycle of optimization. This strategy is used in the case of JSSP and FJSP problems.



**Figure 2.** Single step in SSIA strategy.

Source: own study.

The second strategy – SRLR (strategy based on reinforcement learning rules) – is used to solve the MS-RCPSP problem. In this case the optimizing agents are slightly more complex. They represent simple metaheuristic algorithms. In one cycle of improvement a fixed number of such algorithms is run. In most cases the number does not exceed the population size. A single step of SRLR is shown in Figure 3. A predefined number of such steps is run in one cycle of optimization.



**Figure 3.** Single step in SRLR strategy.

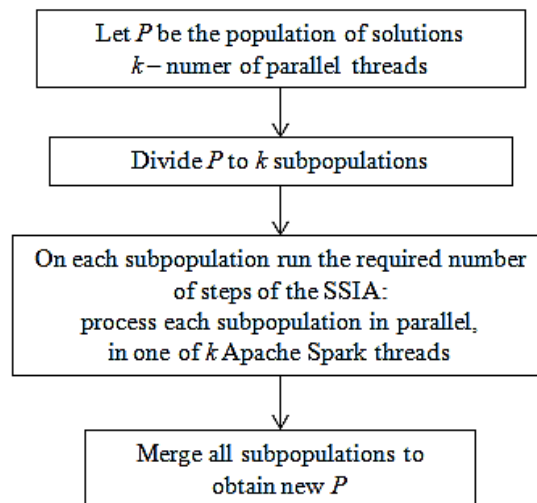
Source: own study.

### 4.3. Parallelisation of the Population-based Approach

Parallelisation involves dividing the main task into smaller, independent tasks that can be executed concurrently. This concept can be applied to population-based systems as follows:

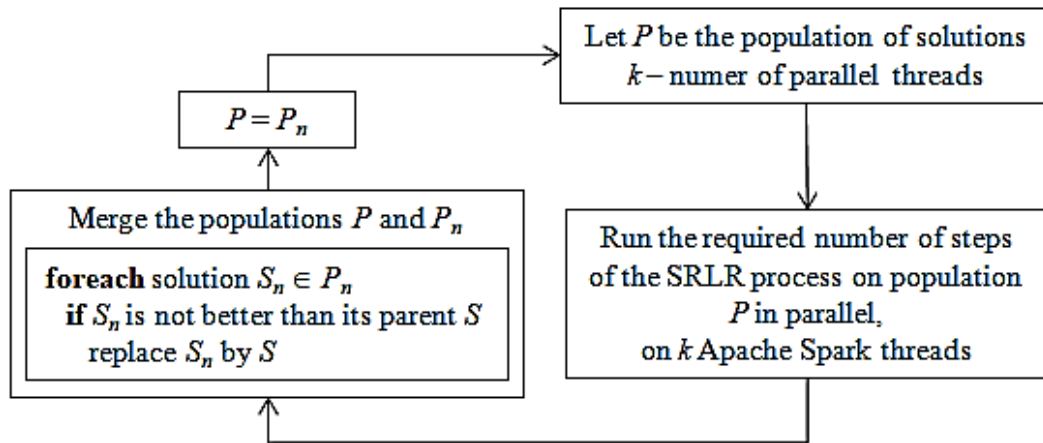
- **Division into Subpopulations:**
  - The entire population is divided into smaller subpopulations. One should recall the island-based evolutionary algorithms.
  - Each subpopulation is assigned to a separate processing unit or thread, allowing simultaneous processing.
- **Independent Evolution:**
  - Each subpopulation evolves independently.
  - By evolving separately, these subpopulations explore different regions of the solution space concurrently. Independent subpopulations are more likely to produce diverse solutions (exploration).
- **Interaction and Information Sharing:**
  - Periodically, the subpopulations are combined into one set and then divided again. In this way, new subpopulations contain solutions from various areas of the solution space.
  - Such (indirect) information sharing helps in propagating good traits across the entire population, preventing subpopulations from stagnating in local optima (exploitation).

The optimization of the populations employing the SSIA strategy is illustrated in Figure 4, while Figure 5 depicts the optimization utilizing the SRLR strategy.



**Figure 4.** Optimization of the population with the use of SSIA.

Source: own study.



**Figure 5.** Optimization of the population with the use of SEA.

Source: own study.

#### 4.3.1. Incorporation of Apache Spark

In both the SSIA and SRLR strategies, a crucial component of the algorithm involves concurrent execution of processes in  $k$  parallel threads. This is achieved by leveraging the capabilities of Apache Spark, where each process runs independently in its dedicated thread within the Apache Spark framework.

By implementing the parallelized approach, the system can leverage the benefits of population-based methods — such as robustness and the ability to escape local optima — while significantly improving computation efficiency and solution diversity.

## 5. Implementation for Scheduling Problems

In the context of scheduling problems there are several elements of the system that should be defined to match the problem being solved, and these are:

- the form of solution, its structure and specific methods related to its processing, particularly the function used for calculating the objective function and functions that address constraint management,
- aforementioned methods for generating new solutions - either through randomization or by employing basic heuristic techniques,
- methods that take solution or solutions and refine them to generate improved versions (optimizing or improvement agents).

For all scheduling problems considered in this paper solutions are represented as lists.

### 5.1. Improvement Agents

Improvement agents are specialized heuristic or metaheuristic optimization algorithms. Each agent is designed to enhance given solution or solutions by applying specific modifications. The introduction of these agents is crucial for dynamically refining solutions, where each agent contributes uniquely to the problem-solving process. They operate on existing solutions, applying techniques like mutation, crossover, or local search, to explore the solution space more effectively and find improved solutions. The diversity and specific functions of these agents are key to addressing the complex constraints and objectives of scheduling problems.

The algorithms used in case of three considered problems are as follows:

#### For JSP and FJSP:

- RandomSwap – replaces elements representing jobs (or operations) on two random positions in the list that represents a solution.
- RandomMove – takes at random one element representing job (or operation) from the list that represents a solution and moves it to another, random position.
- RandomReorder – takes a random slice of the list representing a solution and shuffles the elements in this slice (the order of its elements changes at random).
- Crossover – requires two solutions. A slice from the first solution is extended with the missing elements in the order as in the second solution.

#### Additionally for FJSP:

- RandomReverse – takes a random slice of the list representing a solution and reverses the order of its elements.
- PSOMove – the agent performs one movement on each available particle (solution). The movement is adapted to elements with discrete values. In the case of each particle that has to be processed there is: current solution  $c$  of the particle, local best solution  $lB$  of the particle and global best solution  $gB$ . The new solution is created in such a way, that each  $i$ -th element of the list defining the resulting solution is obtained in the following way:

$$e(i) = \begin{cases} c(i), & \text{with probability } pC \\ lB(i), & \text{with probability } pLb \\ gB(i), & \text{with probability } pGb \end{cases}$$

where  $pC$ ,  $pLb$  and  $pGb$  are given as parameters,  $pC + pLb + pGb = 1$ .

The list created in the above way may result in obtaining a solution that is not feasible. Thus, in the next step the solution's excessive jobs/operations are removed from random positions and instead the missing jobs/operations are inserted in the same positions to create a feasible solution.

**For MS-RCPSP** the improving algorithms are based on simple metaheuristics. All these algorithms return the best solution found in the successive steps of the search process. Three of them use the *maxIt* parameter representing the maximum number of iterations permitted without observing any improvement. The algorithms are as follows:

- **LSAm** – Local Search Algorithm based on activities moving – moves activities in the solution schedule. Simultaneously, the necessary change of assigned resources is checked and performed. In one iteration all possible moves are checked and the best one is carried out.
- **LSAe** – similar to LSAm, exchanging pairs of activities in the solution schedule instead of moving activities.
- **LSAc** – Local Search Algorithm based on one-point crossover operator applied to the pair of solutions. The crossover operation can be applied in each crossing point. Hence for project with  $n$  activities maximum  $n-2$  crossing points can be checked. Because for some projects it may be too time consuming the algorithm stops after fixed number of iteration without improvement.
- **EPTA** – Exact Precedence Tree Algorithm based on the concept of detecting an optimum solution by enumeration for a part of the schedule consisting of some activities. An exact solution for a part of the schedule is found. The beginning of the schedule part is selected randomly without repetition. The size of the schedule part is given as a parameter. The best solution found is remembered.
- **PRA** – Path-Relinking Algorithm where for a pair of solutions from the population a path between them is constructed. Next, the best of the feasible solutions from the path is selected. To construct the path of solutions the activities are moved to other possible places in the schedule. Hence the iteration number is equal to  $n-3$ , where  $n$  is the number of activities in the schedule. All possible moves are checked. Only feasible solutions are accepted. The best solution found is retained.

As one can notice a diverse array of algorithms is employed to improve solutions, illustrating the broad spectrum of complexity these algorithms can embody. On one end of this spectrum, there are straightforward, relatively simple algorithms that make incremental improvements to existing solutions. These simple algorithms are often focused on very basic modification to the solution, such as for example swapping elements within a schedule. On the other end, entire metaheuristic algorithms are utilized, which can be more complex and robust, like for example EPTA. Such algorithms do not just tweak solutions; they explore the solution space using more steps and are capable of making substantial, comprehensive improvements. Another example involves employing a single move from a well-known heuristic, such as Particle Swarm Optimization (PSO), similar to what is done in the PSOMove.

This range from simplicity to complexity in improvement algorithms allows for a versatile approach to solving the scheduling problems presented in these papers, catering to the specific needs and constraints of each problem.

## 5.2. Cache Memories

While solving JSSP another new feature has been used: so called cache memories.

The basic premise is that solutions are represented as lists. Agents tasked with improvement aim to enhance current solutions by altering elements of these lists through methods like moving, swapping, or adjusting parts. The incorporated cache memory serves to track and retain the location (specific index within the list that represents the solution) of each solution's most recent successful modification. This characteristic aids in concentrating the search efforts around areas close to where the last successful alteration occurred. Utilizing the data in the cache memory enhances the collaborative impact of the interactions between agents by guiding them on which segment of the solution to concentrate on in subsequent steps.

## 6. Computational Experiments and Results

The experiments presented in this chapter regarding individual scheduling problems are based on settings derived from the previous papers of the authors: (Jędrzejowicz Wierzbowska, 2022, 2023; Jędrzejowicz, Ratajczak-Ropel, 2023).

### 6.1. JSP

Experiments were run (Jędrzejowicz, Wierzbowska, 2023) on a benchmark dataset for the JSSP problem: the set of 40 instances proposed by (Lawrence, 1985), that have sizes from 5x10 to 15x15. For each task from the dataset at least 30 runs were conducted, for which the average errors and times have been calculated. The settings for the experiments may be found in (Jędrzejowicz, Wierzbowska, 2023).

The results are shown in Tables 1 and 2 under the MPF+ heading (+ stands for the cache memories from Sub-subsection 6.2.1. In both tables the results are compared with other recently published algorithms.

In Table 1 results are compared with Q-Learning Algorithm, QL, (Belmamoune et al., 2022), and a hybrid EOSMA algorithm (Wei et al., 2022) that mixes the strategies of Equilibrium Optimizer (EO) and Slime Mould Algorithm (SMA). The table shows average values calculated from average results for all tasks in considered dataset.



**Table 1.**

*Comparison of results obtained by MPF+ with other recently published results (average error and average running time)*

| MPF+<br>(Jedrzejowicz<br>Wierzbowska, 2023) |              | QL01<br>(Belmamoune et al.,<br>2022) | QL02<br>(Belmamoune et al.,<br>2022) | EOSMA<br>(Wei et al., 2022) |
|---|--------------|--------------------------------------|--------------------------------------|-----------------------------|
| avg error                                   | avg time [s] | avg error                            | avg error                            | avg error                   |
| 1.50%                                       | 143.81       | 5.17%                                | 8.35%                                | 3.20%                       |

Note. avg err – average error calculated in reference to the best-known solution values in terms of the solution makespan.

Source: own study.

In Table 2 the results are compared with the results for the Coral Reef Optimization, CROLS, (Shieh et al., 2022). The results are calculated from results for *la* instances presented in the paper. For each instance, the results from the best model presented in (Shieh et al., 2022) is taken into account.

In both tables the errors have been calculated in reference to the best-known solution values in terms of the solution makespan.

In terms of running times, the algorithms QL0 and QL1 did not provide specific running time information. The EOSMA algorithm required between 10 and 103 seconds to execute.

**Table 2.**

*Comparison of results obtained by MPF+ with other recently published results (average error and average running time for chosen *la* instances)*

| MPF+      |              | CROL1 (Shieh et al., 2022) |              | CROL2 (Shieh et al., 2022) |              |
|-----------|--------------|----------------------------|--------------|----------------------------|--------------|
| avg error | avg time [s] | avg error                  | avg time [s] | avg error                  | avg time [s] |
| 1.37%     | 126.96       | 0.32%                      | 281.99       | 0.39%                      | 257.13       |

Note. avg err - average error calculated in reference to the best-known solution values in terms of the solution makespan.

Source: own study.

Analysis of results from Tables 1 and 2 reveals that MPF+ implementation for solving the JSSP instances performs well as compared with several other approaches, for numerous instances offering better performance or shorter computation time.

## 6.2. FJSP

A number of experiments was run (Jedrzejowicz, Wierzbowska, 2023) on a widely used benchmark dataset: the set of ten FJSP problems by (Brandimarte, 1993), that includes instances of the problem from the size of 10 jobs, 6 machines and 55 operations to the size of 20 jobs, 15 machines and 240 operations.

In the experiments the solutions in the initial population were drawn at random or created with the use of the metaheuristic from (Ziaee, 2014).

In Table 3 the performance of the proposed method – MPF, with no cache memories - is compared with a number of approaches from other papers. The table presents average of the best results obtained for all problems in the Brandimarte set. By the result we understand the

best value of the makespan found by the algorithm. In case of MPF and GATS+HM each Brandimarte problem was solved more than once.

**Table 3.**

*Performance of the MPF FJSP versus other approaches*

| MPF          |              | AC-SD<br>(Han, Yang, 2021) | GWO<br>(Jiang, Zhang, 2018) |               | GATS+HM<br>(Nouri et al., 2017) |              |
|--------------|--------------|----------------------------|-----------------------------|---------------|---------------------------------|--------------|
| avg makespan | avg time [s] | avg makespan*              | avg makespan*               | avg time [s]* | avg makespan                    | avg time [s] |
| 183.7        | 65.8         | 216.9                      | 182.2                       | 545.0         | 178.3                           | 42.26        |

Note. the star indicates that only one solution for each problem in the benchmark dataset was given in the corresponding paper.

Source: own study.

The results, as presented in Table 3, demonstrate both satisfactory quality and competitive computation time, making MPF a worthy addition to the set of available tools for solving FJSS problem instances.

### 6.3. MS-RCPSP

The computational experiment has been carried out using the benchmark instances of MS-RCPSP accessible as a part of Intelligent Multi Objective Project Scheduling Environment (iMOPSE, 2024). The test set includes 36 instances representing projects consisting from 78 to 200 activities. The detailed descriptions and benchmark data analyses can be found in (Myszkowski, 2015, 2019).

In the experiment the metaheuristics described in Section 5.2 have been used with 10 or 20 iterations. Solutions in the initial population were drawn at random or created with the use of the heuristic. Tested populations include from 30 to 50 solutions. The stopping criteria have been set as minimal average diversity in the population not greater than 0.01 and maximal number of SGS procedure calls not greater than 10000. The more detailed description of the proposed by authors approach can be found in (Jędrzejowicz, Ratajczak-Ropel, 2023).

The results for PPMHRL are shown in Tables 4 and 5. During the experiment the following results were calculated and recorded: schedule duration (makespan), standard deviation (STD) and computation time. Each problem instance has been solved 10 times and the results were averaged over these solutions.

In Table 4 the results for two considered population sizes are provided, while in Table 5, the comparison of the results from the literature.

**Table 4.**

*Comparison of results obtained by the PPMHRL for two population sizes*

| PPMHRL( P  = 30) |     |              | PPMHRL( P  = 50) |     |              |
|------------------|-----|--------------|------------------|-----|--------------|
| avg makespan     | STD | avg time [s] | avg makespan     | STD | avg time [s] |
| 333.6            | 3.7 | 954.3        | 327.8            | 4   | 1076.4       |

Note. STD – standard deviation.

Source: own study.

**Table 5.**  
*Comparison of results for approaches from the literature*

| GRAP<br>(Myszkowski, Siemiński, 2016) |     |                 | DEGR<br>(Myszkowski et al., 2018) |     |                 | GP-HH<br>(Lin et al., 2020) |       |                 |
|---------------------------------------|-----|-----------------|-----------------------------------|-----|-----------------|-----------------------------|-------|-----------------|
| avg<br>makespan                       | STD | avg<br>time [s] | avg<br>makespan                   | STD | avg<br>time [s] | avg<br>makespan             | STD   | avg<br>time [s] |
| 341.4                                 | 3.4 | 349.7           | 332.5                             | 5.1 | 1494.9          | 320.5                       | 320.9 | 988.7           |

Note. STD – standard deviation.

Source: own study.

PPMHRL demonstrates promising results, with the population of 50 individuals outperforming the one with 30. The average best result improves by 1.9%, AVG by 1.7%, and the STD is slightly lower. Table 5 compares the obtained results with those from the literature. The proposed approach's results are comparable to several recent papers, with one population-based algorithm, GP-HH (Lin et al., 2020), standing out and outperforming others. GP-HH achieves a better makespan value by an average of 0.7%, especially noticeable as the number of activities increases.

## 7. Conclusions

Making operational decision is an important managerial task. Among variety of operational problems there is a special class of computationally difficult ones. Finding optimum or satisfactory solution of a difficult problem is not an easy task, with the quality and time needed for finding such a solution could be a critical factor from the point of view of the performance, and enterprise success. It is well-known that difficult operational problems include allocation of categorical resources, routing, scheduling and other problems with a combinatorial component. Main contribution of this article is proposing and validating an approach for integrating population-based methods, and parallel computation technologies, enabling to obtain high quality solutions to difficult scheduling problems using reasonable computational resources, including reasonable computation time. We propose the adoption of parallel processing techniques, with a particular emphasis on leveraging Apache Spark for simultaneous execution of population-based metaheuristics. Apache Spark role in enhancing computational efficiency and scalability aligns seamlessly with the demands of parallelized metaheuristics. The study suggest the utilization of diverse population-based strategies and incorporating various improvement algorithms within the population ensuring adaptability and scalability in handling intricate scheduling complexities. The proposed framework has been validated experimentally showing competitive performance as compared with several state-of-the-art approaches based on various metaheuristics. It should be noted that the proposed framework can be used for solving other combinatorial optimization problems.

Future research will focus on finding more effective improvement algorithms, and on applying machine learning techniques for managing and controlling strategies for exploration and intensification of the feasible solution space.

## Acknowledgements

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## References

1. Ajmal, M.S., Iqbal, Z., Khan, F.Z., Ahmad, M., Ahmad, I., Gupta, B.B. (2021). Hybrid ant genetic algorithm for efficient task scheduling in cloud data centers. *Computers and electrical engineering*, vol. 95. doi: 10.1016/j.compeleceng.2021.107419
2. Alba, E., Luque, G., Nesmachnow, S. (2013). Parallel metaheuristics: recent advances and new trends. *International transactions in operational research*, 20(1), pp. 1-48, doi: 10.1111/j.1475-3995.2012.00862.x
3. Aljame, M., Ahmad, I., Alfailakawi, M. (2020). Apache spark implementation of whale optimization algorithm. *Cluster computing*, vol. 23, 09. doi: 10.1007/s10586-020-03162-7
4. *Apache Spark*. Retrieved from: <https://spark.apache.org/>, 20.02.2024.
5. Bellenguez, O., Néron, E. (2005). Lower bounds for the multi-skill project scheduling problem with hierarchical levels of skills. In: E. Burke, M. Trick (Eds.), *Practice and theory of automated timetabling* (pp. 229-243). Berlin/Heidelberg: Springer.
6. Belmamoune, M.A., Ghomri, L., Yahouni, Z. (2022). Solving a job shop scheduling problem using Q-learning algorithm. In: T. Borangiu, D. Trentesaux, P. Leitão (Eds.), *Service oriented, holonic and multi-agent manufacturing systems for industry of the future* (pp. 196-209). Cham: Springer International Publishing, doi: 10.1007/978-3-031-24291-5\_16
7. Brandimarte, P. (1993). Routing and scheduling in a flexible job shop by tabu search. *Annals of operations research*, Vol. 41, pp.157-183, doi: 10.1007/BF02023073
8. Coelho, P., Silva, C. (2021). Parallel metaheuristics for shop scheduling: enabling Industry 4.0. *Procedia computer science*, Vol. 180, pp. 778-786, doi: 10.1016/j.procs.2021.01.328
9. Dell'Amico, M., Trubian, M. (1993). Applying tabu search to the job-shop scheduling problem. *Annals of operations research*, Vol. 41, pp. 231-252, doi: 10.1007/BF02023076

10. Dorigo, M., Di Caro, G. (1999). *Ant colony optimization: A new meta-heuristic*. Vol. 2, doi: 10.1109/CEC.1999.782657.16
11. Elmohamed, M.A.S., Coddington, P., Fox, G. (1998). A comparison of annealing techniques for academic course scheduling. In: E. Burke, M. Carter (Eds.) *Practice and theory of automated timetabling II*, pp. 92-112. Berlin/Heidelberg: Springer.
12. Fontes, D.B., Homayouni, S.M., Gonçalves, J.F. (2023). A hybrid particle swarm optimization and simulated annealing algorithm for the job shop scheduling problem with transport resources. *European Journal of Operational Research*, Vol. 306, no. 3, pp. 1140-1157, doi: 10.1016/j.ejor.2022.09.006
13. Glover, F., Laguna, M. (1999). *Tabu search I*, Vol. 1, doi: 10.1287/ijoc.1.3.190
14. Han, B., Yang, J.J. (2021). A deep reinforcement learning based solution for flexible job shop scheduling problem. *International journal of simulation modelling*, Vol. 20, pp. 375-386, doi: 10.2507/IJSIMM20-2-CO7
15. *Intelligent Multi Objective Project Scheduling Environment (iMOPSE)*. Project homepage. <http://imopse.ii.pwr.wroc.pl/> 20.02.2024
16. Jedrzejowicz, P. (2019). Current trends in the population-based optimization. In: N.T. Nguyen, R. Chbeir, E. Exposito, P. Aniorté, B. Trawí nski (Eds.), *Computational collective intelligence* (pp. 523-534). Cham: Springer International Publishing.
17. Jedrzejowicz, P., Ratajczak-Ropel, E. (2023). *Parallelized population-based multi-heuristic system with reinforcement learning for solving multi-skill resource-constrained project scheduling problem with hierarchical skills*, pp. 243-250, doi: 10.115439/2023F2826
18. Jedrzejowicz, P., Wierzbowska, I. (2022). Implementation of the mushroom picking framework for solving flexible job shop scheduling problems in parallel. *Procedia Comput. Sci.*, Vol. 207(C), pp. 292-298, doi: 10.1016/j.procs.2022.09.062
19. Jedrzejowicz, P., Wierzbowska, I. (2023). *Mushroom picking framework with cache memories for solving job shop scheduling problem*, pp. 157-164. doi: 10.15439/2023F9294
20. Jiang, T., Zhang, C. (2018). Application of grey wolf optimization for solving combinatorial problems: Job shop and flexible job shop scheduling cases. *IEEE Access*, Vol. 6, pp. 26231-26240, doi: 10.1109/ACCESS.2018.2833552
21. Kennedy, J., Eberhart, R. (1995). Particle swarm optimization. *Proceedings of ICNN'95 - International Conference on Neural Networks*, Vol. 4, pp. 1942-1948, doi: 10.1109/ICNN.1995.488968
22. Kirkpatrick, S., Gelatt, C., Vecchi, M. (1983). *Optimization by simulated annealing*. *Science*, Vol. 220. New York, pp. 671-80, doi: 10.1126/science.220.4598.671
23. Lawrence, S. (1984). *Resource constrained project scheduling* - technical report. Pittsburgh, PA, USA: Carnegie-Mellon University.

24. Lin, J., Zhu, L., Gao, K. (2020). A genetic programming hyper-heuristic approach for the multi-skill resource constrained project scheduling problem. *Expert systems with applications*, Vol. 140, doi: 10.1016/j.eswa.2019.112915
25. Lin, S.W., Cheng, C.Y., Pourhejazy, P., Ying, K.C. (2021). Multi-temperature simulated annealing for optimizing mixed-blocking permutation flowshop scheduling problems. *Expert systems with applications*, Vol. 165, doi: 10.1016/j.eswa.2020.113837
26. Lu, H.C., Hwang, F., Huang, Y.H. (2020). Parallel and distributed architecture of genetic algorithm on Apache Hadoop and Spark. *Applied Soft Computing*, Vol. 95, doi: 10.1016/j.asoc.2020.106497
27. Mathlouthi, I., Gendreau, M., Potvin, J.Y. (2021). A metaheuristic based on tabu search for solving a technician routing and scheduling problem. *Computers operations research*, 125, p. 105079. doi: 10.1016/j.cor.2020.105079
28. Myszkowski, P.B., Laszczyk, M., Nikulin, I. and Skowroński, M. (2019). Imopse: a library for bicriteria optimization in multi-skill resource-constrained project scheduling problem. *Soft computing*, Vol. 23, pp. 3397-3410. doi: 10.1007/s00500-017-2997-5
29. Myszkowski, P.B., P. Olech Łukasz, Laszczyk, M., Skowroński, M.E. (2018). Hybrid differential evolution and greedy algorithm (DEGR) for solving multi-skill resource-constrained project scheduling problem. *Applied soft computing*, Vol. 62, pp. 1-14. doi: 10.1016/j.asoc.2017.10.014
30. Myszkowski, P.B., Siemieński, J.J. (2016). Grasp applied to multi-skill resource-constrained project scheduling problem. In: N.T. Nguyen, L. Iliadis, Y. Manolopoulos, B. Trawiński (Eds.), *Computational collective intelligence* (pp. 402-411). Cham: Springer International Publishing.
31. Myszkowski, P.B., Skowroński, M.E., Sikora, K. (2015). A new benchmark dataset for multiskill resource-constrained project scheduling problem. *2015 federated conference on computer science and information systems (FEDCSIS)*, pp. 129-138. doi: 10.15439/2015F273
32. Nouri, H.E., Belkahla Driss, O., Ghedira, K. (2017). Solving the flexible job shop problem by hybrid metaheuristics-based multiagent model. *International journal of industrial engineering*, Vol. 1, 05, pp. 1-14. doi: 10.1007/s40092-017-0204-z
33. Pradhan, A., Bisoy, S.K., Das, A. (2022). A survey on PSO based meta-heuristic scheduling mechanism in cloud computing environment. *Journal of King Saud University – computer and information sciences*, Vol. 34(8, Part A), pp. 4888-4901. doi: 10.1016/j.jksuci.2021.01.003
34. Rajendran, C., Ziegler, H. (2004). Ant-colony algorithms for permutation flowshop scheduling to minimize makespan/total flowtime of jobs. *European journal of operational research*, 155(2), pp. 426-438. Financial Risk in Open Economies. doi: 10.1016/S0377-2217(02)00908-6

35. Sampson, J. (1976). Adaptation in natural and artificial systems (John H. Holland). *Siam review*, Vol. 18, 07, doi: 10.1137/1018105
36. Shieh, C.S., Nguyen, T.T., Lin, W.W., Nguyen, D.C., Horng, M.F. (2022). Modified coral reef optimization methods for job shop scheduling problems. *Applied sciences*, Vol. 12(19), Sep, p. 9867. doi: 10.3390/app12199867
37. Squires, M., Tao, X., Elangovan, S., Gururajan, R., Zhou, X., Acharya, U.R. (2022). A novel genetic algorithm based system for the scheduling of medical treatments. *Expert systems with applications*, Vol. 195, p. 116464. doi: 10.1016/j.eswa.2021.116464
38. Vela, C.R., Afsar, S., Palacios, J.J., González-Rodríguez, I., Puente, J. (2020). Evolutionary tabu search for flexible due-date satisfaction in fuzzy job shop scheduling. *Computers operations research*, Vol. 119, p.104931. doi: 10.1016/j.cor.2020.104931
39. Wang, D., Tan, D., Liu, L. (2018). Particle swarm optimization algorithm: an overview. *Soft computing*, Vol. 22, 01, doi: 10.1007/s00500-016-2474-6
40. Wei, Y., Othman, Z., Mohd Daud, K., Yin, S., Luo, Q. (2022). Equilibrium optimizer and slime mould algorithm with variable neighborhood search for job shop scheduling problem. *Mathematics*, Vol. 10, 11, p. 4063. doi: 10.3390/math10214063
41. Wolpert, D., Macready, W. (1997) No free lunch theorems for optimization. *IEEE transactions on evolutionary computation*, Vol. 1(1), pp. 67-82. doi: 10.1109/4235.585893
42. Wu, A., Yu, H., Jin, S., Lin, K.C., Schiavone, G. (2004) An incremental genetic algorithm approach to multiprocessor scheduling. *IEEE transactions on parallel and distributed systems*, Vol. 15(9), pp. 824-834. doi: 10.1109/TPDS.2004.38
43. Yi, N., Xu, J., Yan, L., Huang, L. (2020) Task optimization and scheduling of distributed cyberphysical system based on improved ant colony algorithm. *Future generation computersystems*, Vol. 109, pp. 134-148. doi: 10.1016/j.future.2020.03.051
44. Ziaee, M. (2014) A heuristic algorithm for solving flexible job shop scheduling problem. *The international journal of advanced manufacturing technology*, Vol. 71, 03, pp. 519-528. doi: 10.1007/s00170-013-5510-z





## MANAGING THE GROWTH OF FEMALE PARTICIPATION IN DATA SCIENCE TECHNOLOGY

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**Purpose:** The research aims to identify the factors influencing this growth, compare it with men's participation, and provide actionable insights for promoting gender diversity in Data Science.

**Design/methodology/approach:** This study employs a detailed analysis of the evolution of Data Science and the changing gender dynamics within this field. The study used a literature review, an analysis of foundational data on women's and men's education and careers, and survey research on a large sample of respondents from different countries.

**Findings:** The study found a notable rise in the number of women pursuing education and careers in Data Science, driven by educational initiatives, support programs, and sociocultural changes promoting gender equality in technical fields. The analysis revealed specific factors that significantly impact this trend, offering insights into effective practices for fostering gender diversity.

**Research limitations/implications:** The study is limited to data from 2017 to 2021, and further research could extend the timeframe or explore different geographical regions for a more comprehensive understanding. The findings provide a foundation for future research on gender dynamics in other technical fields.

**Practical implications:** These strategies can support the ongoing growth and balanced gender representation in Data Science.

**Social implications:** The study underscores the importance of gender equality in technology, emphasizing the role of educational and support programs in empowering women.

**Originality/value:** This study provides original insights into the growth of women's participation in Data Science, identifying key factors and management practices that can sustain and enhance this trend. The findings contribute valuable knowledge to the discourse on gender diversity in technology and offer practical solutions for fostering an inclusive environment in Data Science.

**Keywords:** Data Science, technology, management, social change, education, women.

**Category of the paper:** Research paper.

## 1. Introduction

Data Science, which is an interdisciplinary scientific field, uses mathematical, statistical and computer science techniques to analyse and interpret large data sets. Over the years, these techniques have become an indispensable tool for organisations collecting and processing data, enabling them to extract valuable information from it. Data Science encompasses areas such as knowledge discovery, machine learning and predictive learning, with applications in a wide range of sectors from healthcare to finance and retail (Corea, 2018). The history of Data Science dates back to the early 20th century, when statisticians and engineers began using the first predictive models. Over time, as computer technology developed and data collection and processing capabilities increased, Data Science evolved to integrate elements of artificial intelligence and machine learning (Kotu, 2019). A watershed moment was the birth of the Internet, which significantly increased the amount of data available, and advances in the processing and storage of this data opened up new opportunities for analysts and researchers. Today, Data Science is used in various sectors of life, influencing developments in medicine, energy, manufacturing, as well as entertainment and media. The increase in data generation and the development of cloud technologies and mobile health devices have led to significant improvements in many areas, such as healthcare, where data analysis leads to better diagnoses and personalised patient care (Nielsen, 2015). One of the key aspects of the development of Data Science is data management, which includes both the collection and analysis of data, as well as the identification of patterns and relationships (Wengrow, 2017). In the context of governance, Data Science plays an important role in business process optimisation, risk management and evidence-based decision-making (Mahdavinejad et al., 2018). However, there are also challenges related to data privacy, structural biases and the need to balance opportunities with technological limitations (Thilak, 2018). The future of Data Science seems promising, with a growing demand for skilled professionals and further development of technologies based on artificial intelligence and machine learning (Robinson, Nolis, 2020). Organisations are increasingly investing in advanced analytics systems to better understand and manage data, resulting in increased efficiency and competitiveness (Kelleher, 2018).

The aim of this research was to investigate the factors influencing women's participation in the field of data science, compared to men. The research aimed to identify gender differences in access to education, the labour market, and career achievements in the field of data science.

## 2. Literature research

For many years, research has been conducted to explain gender roles and the inequalities that exist between them. Some of the gender differences in human behaviour have been attributed to selection pressures associated with inter-sexual selection and intra-sexual competition (Zhu, Chang, 2019). Challenges include identifying reproductively valuable partners for both sexes, reducing paternity uncertainty for males and inducing parental investment in offspring for females (Geary, 2000). Males and females face different challenges due to higher rates of reproduction in males, resulting in gender differences in parental investment (Buss et al., 2001). Despite the many differences in theories of evolutionary psychology, all maintain that sex differences ultimately arise through selection for inherited traits rather than non-genetic processes such as social learning. According to Wood and Eagly's biopsychosocial model, men achieve higher status through a monopoly on 'warfare, agriculture and productive activities', which generate far more material wealth than domestic labour (Wood, Eagly, 2012). However, in contrast to the theories of evolutionary psychology, the biopsychosocial model assumes that gender mating preferences result from socially constructed patriarchal systems and not from sexual selection (Wood, Eagly, 1999). In human society, it has been shown that unpredictability (e.g. disasters, violence, famine and disease), through its indirect effects on families, 'accelerates' the life history of individuals as manifested by earlier physiological, sexual maturation and earlier reproduction (Ellis, Essex, 2007). All these factors effectively serve to prolong the reproductive career of females and ultimately maximise the current reproductive success of both sexes (Wood, Eagly, 2012). In this way, the chance of an individual leaving at least one offspring before being affected by disease or dying in an unsafe environment may increase (Figueredo et al., 2009). Although both sexes benefit from a reproductive strategy, women bear a much greater cost of such a strategy (Buss, Schmitt, 2011). Reproductive activities such as pregnancy, breastfeeding and childcare are major barriers to women's participation in most economic production activities (Alexander, 1999; Roudsari et al., 2023). The relative vulnerability of women at critical times also increases their dependence on male provisioning even in traditional societies where women and men contribute similarly to subsistence (Clark, Thorpe, 2023; Puts, 2010). Moreover, due to imbalances in initial parental investment in mammals (including humans), mothers are predisposed to provide direct care for their offspring to a greater extent than fathers (Betzig, 2012, Koch, Narum, 2021). A consequence of external risk is also increased competition between males and social competition (Henrich, Gil-White, 2001). It allows successful individuals to control resources and/or offspring without frequent changes from subordinates leading to status hierarchies (Snyder et al., 2008). Dominance hierarchies shaped by different forms of competition favour males more often. Sexual dimorphism in terms of physical strength, aggressiveness and psychological competition favours men in combat and in posing

threats (Jozifkova et al., 2022). Male-dominated power hierarchies reinforce traditional gender roles, which maximises men's reproductive success by monopolising (numerous or younger) female partners (Brooks et al., 2022). Polygynous societies, limit women's access to all resources (Micheletti, Mace, 2024). Women usually prefer to be one of several spouses of a wealthy man rather than the only wife of a poor one. Social rivalry (competition) based on skills and altruism can also have reproductive benefits for individuals with high prestige (Furnham, Cuppello, 2024). Based on the study, women preferred men with high prestige and low dominance in long-term relationships, but men with high dominance were preferred in short-term relationships. These analyses can lead to many predictions about gender roles and gender inequality. In societies that are dangerous and unstable, but lacking strong competition, the traditional gender division of labour may prevail (Matriano et al., 2022). Women may enjoy similar social status to men. On the other hand, in safe, stable and competition-oriented societies, modernised gender roles and equal values are promoted (Pfefferman et al., 2022). When external risks are combined with social rivalry, reproductive goals focused on the present are prioritised which contributes to traditional gender roles (Cassar, Rigdon, 2023). Male competition in difficult and unpredictable environments can promote a male monopoly on resources and a dominance-based social hierarchy that favours men and perpetuates gender inequality (Naiman, 2020). In societies that are stable and secure but non-competitive, men may seek to fulfil their reproductive potential by setting reproductive goals focused on the present while women may prefer lower reproductive costs by setting reproductive goals focused on the future (Desai, 2023). A compromise may lead to a moderate segregation of gender roles and the male-dominated social hierarchy would allow for a degree of gender equality (Ebirim et al., 2024).

According to what we were able to find in the literature, there is no research addressing and reporting on how modern technology, globalisation and social change affect gender roles and gender inequalities. The authors potentially add to the literature by conducting an analysis of the factors influencing women's participation in the field of data science, compared to men.

### **3. Methods**

The aim of this study was to investigate the factors affecting women's participation in the field of data science compared to men. The study aimed to identify gender differences in access to education, the labour market and professional achievement in the field of data science.

To achieve the research objective, the authors set out to answer three main research questions:

- What factors contribute to the persistent wage gap between men and women in data science, despite the increase in women's educational attainment?
- What are the main reasons for women's lower participation in educational programmes and data science professions and their slower career progression compared to men?
- How does starting a family affect women's careers in data science compared to men?

A variety of research methods were used to comprehensively address the topic of investment in women's education and their role in data science and technology, drawing on a wide range of statistical data, reports, quantitative and qualitative research and case studies.

Statistics on the average educational attainment of women and men in different countries over the years are presented.

Data on the number of women achieving master's and doctoral degrees, as well as their representation in various Data Science fields, were also analysed.

The analysis was also based on the results of quantitative surveys such as 'The Global Survey of Scientists', which examined gender diversity in science worldwide. This was conducted with a sample of over 32,000 respondents from 159 countries. This survey looked at various aspects, including career choices, working conditions and family responsibilities of women in the sciences.

The article also refers to reports from organisations such as UNESCO and the World Economic Forum (WEF). The authors cite the WEF's Global Gender Gap Report, which analyses women's participation in the AI sector and their contribution to industrial innovation.

A comparative analysis method was used to collate data on the education and salaries of women and men and their representation in technical and managerial positions in multinational technology companies.

Specific country and company examples are also analysed to show the progress and challenges of women's education and employment in science and technology.

## **4. Results and Discussion**

Investing in women's education is considered an antidote to the many challenges of the developing world. Both academics and politicians as well as marketing agencies have defended the intrinsic and instrumental value of women's education (Evans et al., 2020). Based on a review of research from the last 15 years, it has been confirmed that investing in girls' education also has high returns in terms of maternal and child health, more stable families, women's empowerment, democracy, income growth and productivity (Herz, Sperling, 2004).

A strong correlation was also found between women's participation in the labour force and education in low- and middle-income countries (Psacharopoulos, Tzannatos, 1989).

In 1960, adult women in North American and Central European countries had an average of 2.6 years of education (Evans et al., 2020). By 2010, this figure had almost tripled to 7.7 years of education. Men's education also increased from 3.5 years of education in 1960 to 8.2 years in 2010. The United Arab Emirates, the country with the largest increase in women's education also started with a low of 0.9 years of education for the average woman and increased to 10 years by 2010 (Bouguen et al., 2018). In most countries, the increase in female education has been accompanied by an increase in male education.

Today, women achieve 60 per cent of all master's degrees and more than half of all doctoral and master's degrees in engineering (DiPrete, 2013). The only significant area of education where women still lag behind men is in participation in science and engineering programmes. However, even in some areas of science, women have made progress, admittedly earning only 25% of engineering degrees, but achieving 52% of master's and doctoral degrees in the natural sciences (Bouguen et al., 2018).

The increase in the number of women in education has not evened out the gender pay gap. Women with higher education still earn less on average than men with the same education (DiPrete, 2013).

However, the rapid increase in the number of women with higher education has certainly contributed to narrowing the gender earnings gap. For more than 100 years, girls have outperformed boys in educational attainment. But back then, women often had to choose between getting an education and starting a family. Women who graduated from university in the first two decades of the 20th century were four times less likely to marry at age 50 than their peers who did not attend university. Among women who did marry, about 30 % never had children (Goldin et al., 2014).

When, in the 1950s, education was treated on a par with family life, a significant proportion of Americans believed that the purpose of education was to make women better wives and mothers, and that a woman's place was in the home. As a result, although more women entered college in those days their percentage was much higher and many women dropped out of college as soon as they became engaged or married (DiPrete, 2013). These norms slowly began to change in the 1960s and 1970s, when the civil rights movement and the women's movement promoted equal opportunities in education and employment for women and minorities. These changes, along with advances in contraception, created an environment more conducive for women to pursue higher education and use their degrees to find work outside the home. The growing wage advantage for workers with higher education was also a strong incentive to work (DiPrete, 2013).

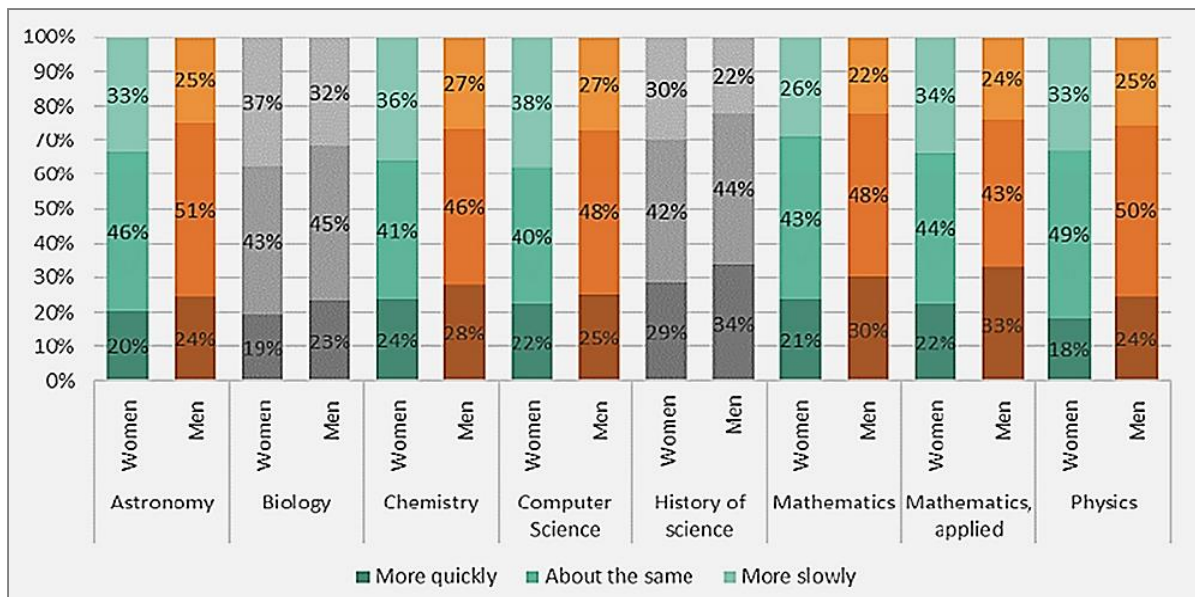
However, reversing the gender gap in education has the potential to undermine the motherhood penalty. When a wife has a higher education than her husband, not only are there chances of her becoming the main breadwinner in the family, but this also offsets the motherhood penalty (Oláh et al., 2023). This phenomenon may occur in countries where it is easier for women to combine a career with parenthood. In Europe, when both partners have a university degree, the proportion of couples in which she earns more than he does is about one-third of childless couples, while among couples with school-age children it is only one-fifth (Cooke et al., 2013; Mortelmans, 2021). In contrast, in the case where the wife has a tertiary education and her husband does not, the percentage of couples in which the wife earns more than the husband is as high as for childless couples with a tertiary education (Lappegård, 2020). Earning potential and work experience may begin to outweigh women's cultural preference to limit their work after having children.

Women's advantage in terms of education or earnings is no longer associated with less marital stability. Historically, such a phenomenon was quite common, but this is now increasingly changing ([www.frbsf.org](http://www.frbsf.org)).

One study found that wife employment is still associated with a higher risk of divorce in the USA, but no longer in European countries or Australia. In Finland, Norway and Sweden, wife employment even predicted a lower risk of divorce compared to couples where the wife stayed at home (Cooke et al., 2013).

The prospect of raising children where both mother and father are working people offers a good chance of reducing the gender role gap. Children with such an image are less likely to be influenced by the stereotype, where the father is the head of the family and the main breadwinner and the mother takes care of household chores. Young women, having the image of a working mother, also want to be independent and strive to achieve their own goals and be the best in their profession. Factors such as geographical location, cultural, religious and many other factors lead to this trend being shaken. However, all indications are that the level of awareness among women in personal development, learning and work is increasing.

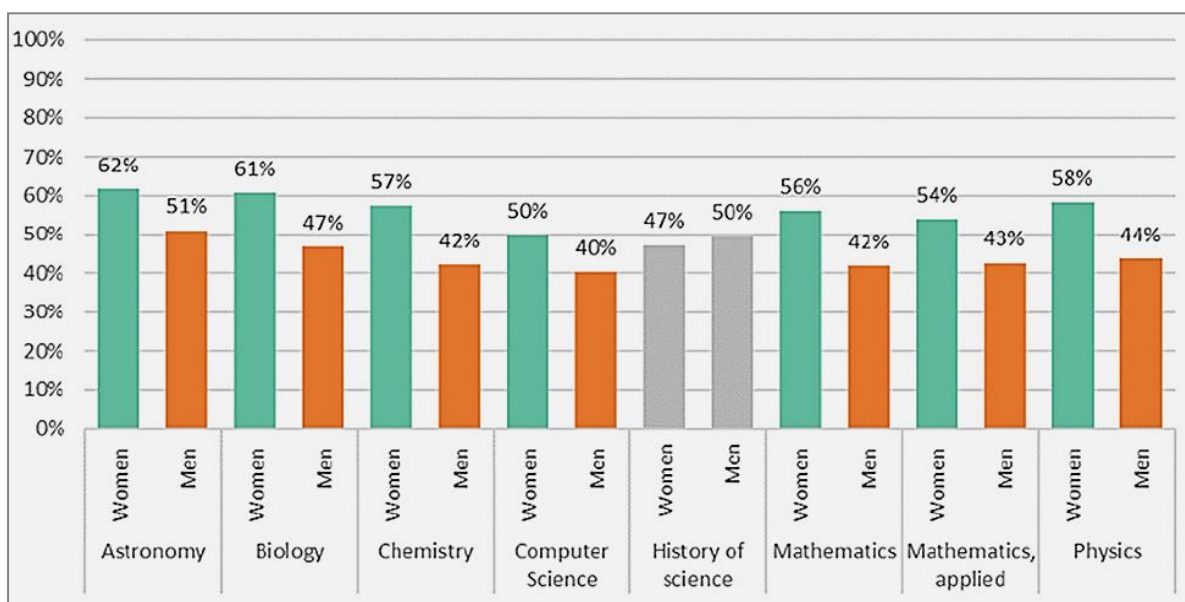
In an era of globalisation and rapid technological development, the roles of men and women have changed, adapting to modern technology (Beura, 2017). Although women are increasingly studying science, technology, engineering, mathematics and medicine, they are still a minority of executives. They are less likely to be trained in elite research groups, are slower to be promoted and more likely to give up their careers (National Academy of Science, 2006). The group 'The Global Survey of Scientists' examined gender diversity in science worldwide, covering education, working conditions and family responsibilities (Guillopé, Roy, 2020). Conducted between May and December 2018, the research surveyed more than 32,000 people from 159 countries, indicating general trends across disciplines and geographies (Figure 1).



**Figure 1.** Percentage of respondents comparing their career trajectory with colleagues who graduated at the same time, by discipline (grey colour indicates statistically non-significant differences by gender at the 0.002 level).

Source: Own elaboration based on: Mei-Hung Chiu and Mark Cesa, A Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences: How to Measure It, 2020.

In every profession and in every field, men dominate among those who have achieved their professional goals faster and advanced their careers faster. They achieve success much faster than women, especially in sciences such as chemistry, mathematics, astronomy and physics (Figure 2).

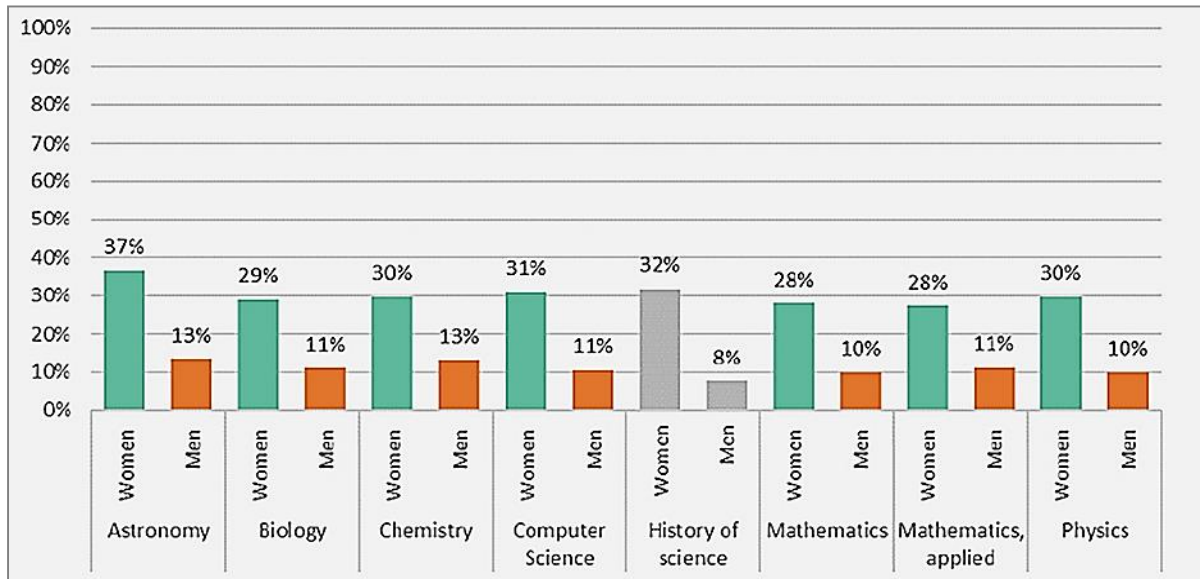


**Figure 2.** Percentage of respondents indicating that their career had influenced their decisions regarding children, marriage or long-term partnership by occupation (grey colour indicates statistically non-significant differences by gender at the 0.002 level).

Source: Own elaboration based on: Mei-Hung Chiu and Mark Cesa, A Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences: How to Measure It, 2020.



When it comes to the influence of a professional career on the decision to start a family, marriage or a long-term relationship - a slightly, but higher percentage of respondents are women. Such results show that to a greater extent women subordinate their professional life to their family, private life (Figure 3).



**Figure 3.** Percentage of respondents indicating that their career or promotion rate slowed down significantly because they became parents by discipline (grey colour indicates statistically non-significant differences by gender at the 0.002 level).

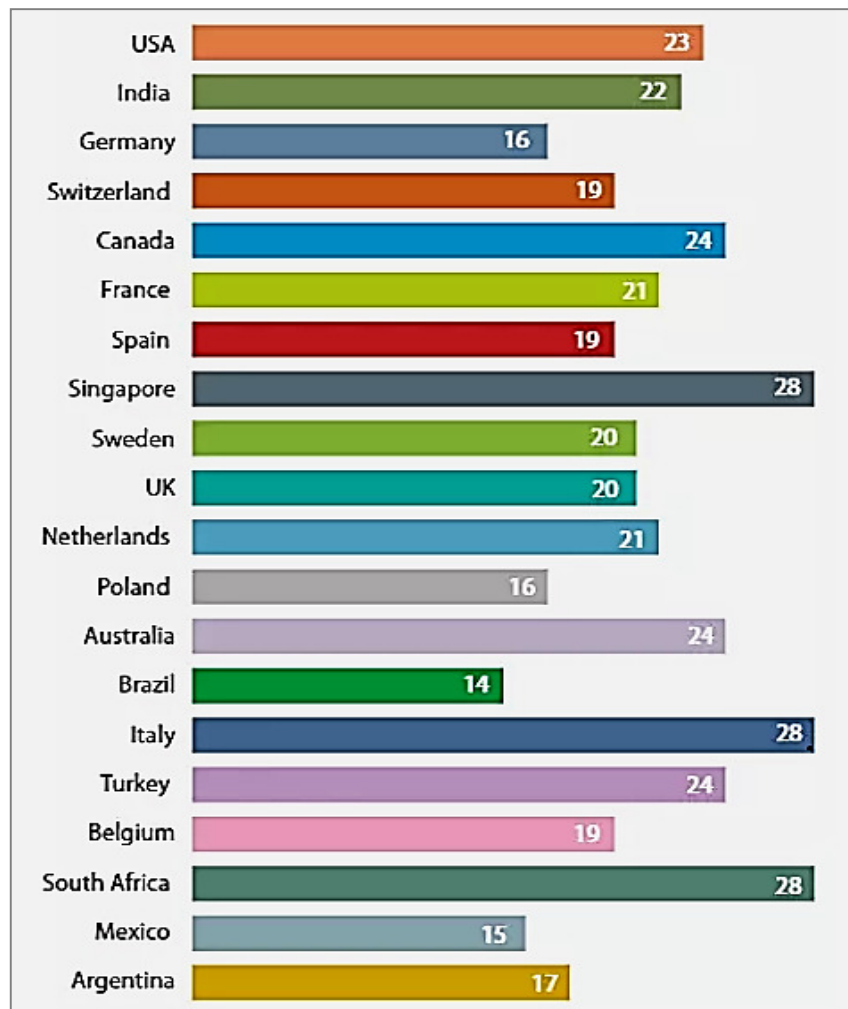
Source: Own elaboration based on: Mei-Hung Chiu and Mark Cesa, A Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences: How to Measure It, 2020.

A significant career slowdown in women occurs when they become parents. Although the career pace slows down for both genders, this is much more pronounced in women, reaching 30-40% in each field, compared to around 10% in men.

Research has shown that systematic differences between women's and men's experiences continue to exist across all regions, disciplines and levels of development (UNESCO Institute for Statistics, 2021). Women were more likely than men to drop out of education, which negatively affected their professional credibility. More women than men reported that they were discriminated against when assessing or evaluating their performance because of their gender (UNESCO Institute for Statistics, 2021). Fewer women felt they were treated fairly in their work environment, and women were more likely to report lower pay than their male colleagues (Guillopé, Roy, 2020).

In 2019, UNESCO and the Equal Skills Coalition analysed women's participation and contribution to industrial innovation. The fields related to optimisation and automation, key to driving industry, are those in which women are underrepresented in most countries: computer science, physics, mathematics and engineering (UNESCO Institute for Statistics, 2021). In the US in 2015, women made up 57% of professionals, but only 25% of computer scientists. Women are more likely than men to leave the tech industry, most often because of working conditions, lack of access to key creative roles and a sense of professional stagnation

(Ashcraft, 2021). Female engineers earn 84% of what their male colleagues earn, despite their higher level of education; in 2017, 12% of female engineers had a postgraduate degree, compared to 7.4% of male engineers (World Economic Forum, 2018). Women are also underrepresented in the fast-growing AI sector. According to the World Economic Forum, from 2015 to 2017, the number of workers with AI skills increased by 190% (World Economic Forum, 2018). The pay gap in AI is one of the smallest between men and women in the US, with women earning 94% of what men earn (AAUW, 2018) (Figure 4).

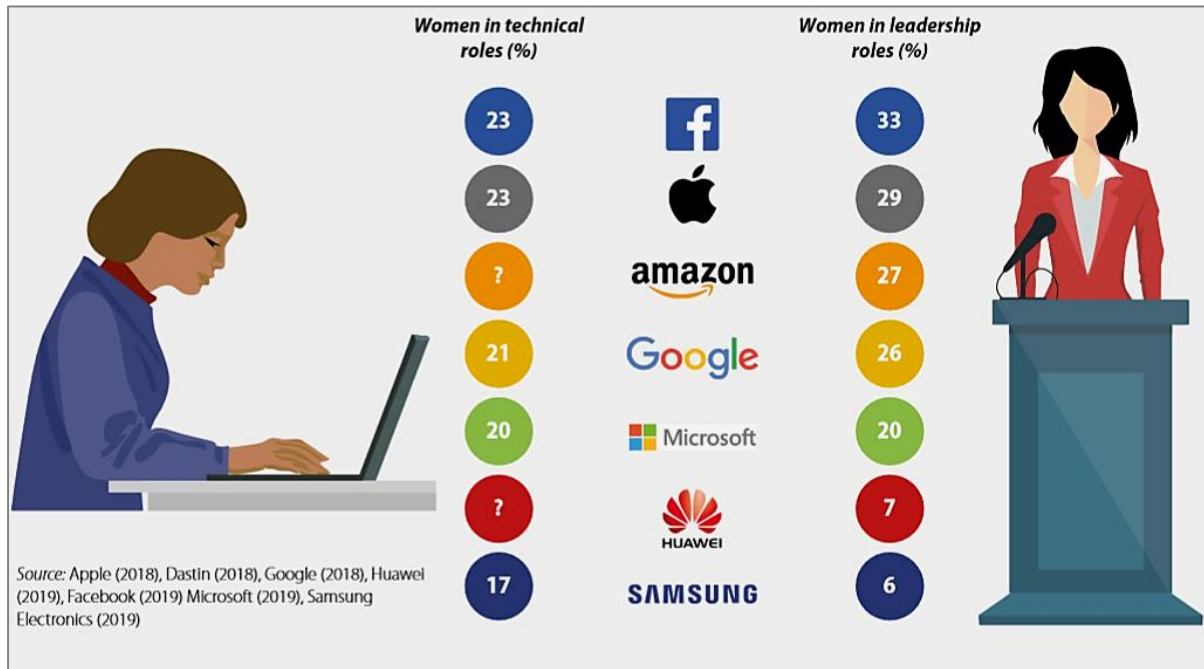


**Figure 4.** Share of women in the 20 countries with the highest job security for professionals with AI skills in 2017. (%) (In descending order for countries with the highest job security).

Source: Own elaboration based on: WEF, The Global Gender Gap Report 2018, World Economic Forum: Geneva, 2018.

According to data collected and presented in the World Economic Forum's Global Gender Gap Report, only 22% of professionals working in AI worldwide are women. This gap is evident in all 20 countries with the highest concentration of AI workers (Figure 4) and is particularly pronounced in Argentina, Brazil, Germany, Mexico and Poland, where less than 18% of female professionals have AI skills (The Global Gender Gap Report, 2018).

While leading multinational technology companies are making progress, they are still not even close to closing the gender gap in technical and managerial positions. Although there has been some progress at Google in terms of the percentage of female employees, in 2018 less than a quarter of technical positions were filled by women (Figure 5).



**Figure 4.** Women in technical and managerial positions at selected leading international technology companies in the years: 2018-2019.

Source: Apple (2018), Dastin (2018), Google (2018), Huawei (2019), Facebook (2019) Microsoft (2019), Samsung Electronics (2019).

Nevertheless, women are approaching equality in science at least in terms of numbers. In higher education, they have reached a gender ratio of 45-55 % at undergraduate and master's level and 44 % at doctoral level (Google diversity annual report, 2018). In many countries, they dominate in the natural sciences but remain a minority in digital computing, physics or mathematics. These fields drive industry and thus will provide many jobs in the future.

## 5. Summary

The analysis showed that women are more likely than men to drop out of school and to experience discrimination in the assessment of their career achievements. Significant differences between women's and men's career experiences are evident across all regions and disciplines, suggesting that systematic gender barriers still exist.

Women in Data Science were more likely to report lower pay compared to their male counterparts, despite higher levels of education. The research also indicates that women are underrepresented in key technological areas such as computer science, physics, mathematics and engineering, limiting their contribution to industrial innovation.

In the context of managing gender differences, the article highlights the importance of educational initiatives, support programmes and social and cultural changes that promote gender equality in the technical sciences.

The results of this study cannot be considered complete and exhaustive, as some data may be outdated or incomplete, which affects the accuracy of the conclusions.

The study does not fully represent the diversity of women's experiences and perspectives around the world, especially in regions with less access to education and technology.

Taking these limitations into account is crucial for proper interpretation and recommendations.

## References

1. AAUW (2018). *Work Smart aims to train millions in salary negotiation*, pp. 7-10.
2. Alexander, R.D. (1989). Evolution of the human psyche. *The human revolution: Behavioural and biological perspectives on the origins of modern humans*, 455-513.
3. Ashcraft, C., McLain, B., Eger, E. (2021). *Women in tech: The facts*.
4. Betzig, L.L. (2012). Means, variances, and ranges in reproductive success: comparative evidence. *Evolution and Human Behavior*, 33, 309-317.
5. Bouguen, A., Filmer, D., Macours, K., Naudeau, S. (2018). Preschool and parental response in a second best world: Evidence from a school construction experiment. *Journal of Human Resources*, 53(2), 474-512.
6. Brooks, R.C., Blake, K.R., Fromhage, L. (2022). Effects of gender inequality and wealth inequality on within-sex mating competition under hypergyny. *Evolution and Human Behavior*, 43(6), 501-509.
7. Buss, D.M., Schmitt, D.P. (2011). Evolutionary psychology and feminism. *Sex Roles*, 64, 768-787.
8. Buss, D.M., Shackelford, T.K., Kirkpatrick, L.A., Larsen, R.J. (2001). A half century of mate preferences: The cultural evolution of values. *Journal of Marriage and Family*, 63, 491-503.
9. Cassar, A., Rigdon, M. (2023). Sustaining the potential for cooperation as female competitive strategy. *Philosophical Transactions of the Royal Society B*, 378(1868), 20210440.
10. Clark, M., Thorpe, H. (2023). 'I just don't trust my pelvic floor': Examining the bio-social

- barriers to maternal health and physical activity participation in a sample of mothers from New Zealand. *SSM-Qualitative Research in Health*, 3, 100261.
11. Cooke, L.P., Erola, J., Evertsson, M., Gähler, M., Härkönen, J., Hewitt, B., Jalovaara, M., Kan, M.-Y., Lyngstad, T.H., Mencarini, L., Mignot, J.-F., Mortelmans, D., Poortman, A.-R., Schmitt, C., Trappe, H. (2013). Labor and Love: Wives' Employment and Divorce Risk in its Socio-Political Context. *Social Politics: International Studies in Gender, State & Society*, 20(4), 482-509. <https://doi.org/10.1093/sp/jxt016>
  12. Coreia, F. (2018). *An introduction to Data*. Springer.
  13. Desai, R. (2023). *Capitalism, coronavirus and war: A geopolitical economy*. Taylor & Francis.
  14. DiPrete, T.A. (2013). *The Rise of Women: The Growing Gender Gap in Education and What It Means for American Schools*. Columbia University.
  15. Ebirim, G.U., Asuzu, O.F., Ndubuisi, N.L., Adelekan, O.A., Ibeh, C.V., Unigwe, I.F. (2024). Women in accounting and auditing: a review of progress, challenges, and the path forward. *Finance & Accounting Research Journal*, 6(2), 98-111.
  16. Ellis, B.J., Essex, M.J. (2007). Family environments, adrenarche, and sexual maturation: a longitudinal test of a life history model. *Child Development*, 78.
  17. Evans, D.K., Akmal, M., Jakiela, P. (2020). *Gender gaps in education: The long view*.
  18. Figueredo, A.J., Brumbach, B.H., Schlomer, G.L. (2009). Fundamental dimensions of environmental risk. *Human Nature*, 20, 204-268.
  19. Furnham, A., Cuppello, S. (2024). Sex, personality, and mate preferences. *Evolutionary Behavioral Sciences*.
  20. Geary, D.C. (2000). Evolution and proximate expression of human paternal investment. *Psychological Bulletin*, 126, 55-77.
  21. Goldin, C. (2014). A grand gender convergence: Its last chapter. *American economic review*, 104(4), 1091-1119.
  22. Google (2018). *Google diversity annual report 2018*, pp. 15-22.
  23. Guillopé, C., Roy, M.-F. (2020). *A global approach to the gender gap in mathematical, computing and natural sciences: How to measure it, how to reduce it?* International Mathematical Union.
  24. Henrich, J., Gil-White, F.J. (2001). The evolution of prestige: freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, 22, 165-196.
  25. Herz, B., Sperling, G. (2004). *What works in girl's education*. Council on Foreign Relations.
  26. Jozifkova, E., Kolackova, M., Sykorova, K. (2022). Dominance hierarchy in a nutshell: why, how, dangers and solutions. *Neuroendocrinology Letters*, 43(5).
  27. Kelleher, J.D. (2018). *Data Science*. The MIT Press.
  28. Koch, I.J., Narum, S.R. (2021). An evaluation of the potential factors affecting lifetime reproductive success in salmonids. *Evolutionary Applications*, 14(8), 1929-1957.

29. Kotu, V., Deshpande, B. (2019). *Data Science Concepts and Practice*. Morgan Kaufmann.
30. Lappegård, T., Duvander, A.Z., Neyer, G., Viklund, I., Andersen, S.N., Garðarsdóttir, Ó. (2020). Fathers' use of parental leave and union dissolution. *European Journal of Population*, 36, 1-25.
31. Mahdaveinejad, M., Rezvan, M., Barekatin, M., Adibi, P., Barnaghi, P., Sheth, A. (2018). *Machine learning for internet of things data analysis*. Chongqing University of Posts and Telecommunications.
32. Matriano, M.G., Ivers, R., Meedy, S. (2022). Factors that influence women's decision on infant feeding: an integrative review. *Women and Birth*, 35(5), 430-439.
33. Micheletti, A.J., Mace, R. (2024). Sibling competition and dispersal drive sex differences in religious celibacy. *Evolution and Human Behavior*, 45(2), 144-152.
34. Mortelmans, D. (2021). Causes and consequences of family dissolution in Europe and post-divorce families. In: *Research Handbook on the Sociology of the Family* (pp. 232-247). Edward Elgar Publishing.
35. Naiman, J. (2020). *How Societies Work: Class, Power, and Change*. Fernwood Publishing.
36. Nielsen, L. (2015). *A simple introduction to data science*. New Street Communications.
37. Oláh, L.S., Richter, R., Kotowska, I.E. (2023). Introduction to the Special Collection on The new roles of women and men and implications for families and societies. *Demographic Research*, 48, 849-866.
38. Pfefferman, T., Frenkel, M., Gilad, S. (2022). On gendered justification: A framework for understanding men's and women's entrepreneurial resource-acquisition. *Journal of Management Studies*, 59(2), 249-283.
39. Psacharopoulos, G., Tzannatos, Z. (1989). Female labor force participation: An international perspective. *The World Bank Research Observer*, 4(2), 187-201.
40. Puts, D.A. (2010). Beauty and the beast: mechanisms of sexual selection in humans. *Evolution and Human Behavior*, 31, 157-175.
41. Robinson, E., Nolis, J. (2020). *Build a Career in Data Science*. Manning Publications.
42. Roudsari, R.L., Sharifi, F., Goudarzi, F. (2023). Barriers to the participation of men in reproductive health care: A systematic review and meta-synthesis. *BMC Public Health*, 23(1), 818.
43. Snyder, J.K., Kirkpatrick, L.A., Barrett, H.C. (2008). The dominance dilemma: do women really prefer dominant mates? *Personal Relationships*, 15, 425-444.
44. Thilak, R. (2018). *The History of Data Science*. Towards Data Science.
45. UNESCO Institute for Statistics (2016). *SAGA Science, Technology and Innovation Gender Objectives List*.
46. UNESCO Institute for Statistics (2021). *The gender gap in science and technology, in numbers*.
47. Valletta, R. (n.d.). Education, skills, and technical change. Federal Reserve Bank of San Francisco. <https://www.frbsf.org/wp-content>, 1.07.2024.

48. Wengrow, J. (2017). *A Common-Sense Guide to Data Structures*. Pragmatic Bookshelf.
49. Wood, W., Eagly, A.H. (1999). The origins of sex differences in human behavior: Evolved dispositions versus social roles. *American Psychologist*, *54*, 408-423.
50. Wood, W., Eagly, A.H. (2012). Biosocial construction of sex differences and similarities in behavior. *Advances in Experimental Social Psychology*, *46*, 55-123.
51. World Economic Forum (2018). *The Global Gender Gap Report 2018*. Geneva: World Economic Forum, pp. 20-25, 106-109.
52. Zhu, N., Chang, L. (2019). Evolved but not fixed: A life history account of gender roles and gender inequality. *Frontiers in Psychology*, *10*, 1709.





## JOB SATISFACTION AND EMPLOYEE PERFORMANCE AN ELEMENT OF INNOVATIVE MANAGEMENT

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**Purpose:** This article aims to explore the relationship between job satisfaction, employee motivation, and work performance, as perceived by employees. The study seeks to identify key factors that enhance workplace efficiency and provide actionable insights for organisational improvement.

**Design/methodology/approach:** The research employs a mixed-methods approach, combining quantitative surveys and qualitative interviews. Data were collected from a diverse group of employees across various industries to ensure a comprehensive understanding of the factors influencing work performance.

**Findings:** The study reveals a strong correlation between job satisfaction and employee performance, highlighting the critical role of effective motivational systems within organisations. It was found that employees with higher job satisfaction levels are more engaged and productive. Key factors contributing to these outcomes include supportive management practices, opportunities for professional growth, and a positive work environment.

**Practical implications:** The findings offer valuable insights for HR professionals, managers, and business leaders seeking to enhance employee performance. Implementing effective motivational strategies and creating a supportive workplace culture can lead to improved productivity and employee satisfaction.

**Social implications:** This research underscores the importance of addressing job satisfaction and motivation as integral components of employee well-being. By fostering a positive work environment, organisations can contribute to the overall well-being of their workforce, which in turn can have positive ripple effects on their families and communities.

**Originality/value:** This study provides a unique contribution by integrating employee perspectives from various sectors, offering a holistic view of the factors influencing job performance. The findings emphasize the need for tailored motivational strategies that align with employee expectations and organisational goals, presenting a framework for future research and practical application in diverse workplace settings.

**Keywords:** job satisfaction, employee motivation, work performance, organizational efficiency, human resources management.

**Category of the paper:** Research paper.

## 1. Introduction

Motivation in the process of human resource management can most accurately be defined as one of the functions of employee management, belonging to management, which consists in the appropriate shaping of preferred behaviours and actions taken by employees, with the use of appropriate motivational instruments, the aim of which is the realisation of the tasks established in the organisation (Polkowska, 2024; Steinerowska-Streb, Wronka-Pośpiech, 2022). Motivation in a professional setting makes it possible to elicit certain attitudes of employees, but effective motivation is necessary, i.e. motivation that will act on the needs of employees, on the aspects that motivate them, and this requires knowledge of one's own employees (Wojciechowska et al., 2019; Rogowska, 2020). This thus means that motivation is a process of creating employee behaviour on the basis of an in-depth knowledge of employees and the factors that influence their behaviour (Bera, 2020).

The essence of effective employee motivation is the appropriate, skilful and rational application of specific motivation measures in such a way that they produce the desired results, both in relation to employees' expectations and employers' strategic objectives (Kozłowski, 2017; Czechowska-Bieluga, 2021).

The aim of this article is to explore and present the relationship between different aspects of work and job performance based on the opinions of the employees surveyed. In particular, the article focuses on three key areas:

1. Diagnosis of the level of motivation and its impact on employee performance.
2. Analysis of the impact of job satisfaction on job performance.
3. Identification of the key factors that respondents believe have the greatest impact on their professional performance.

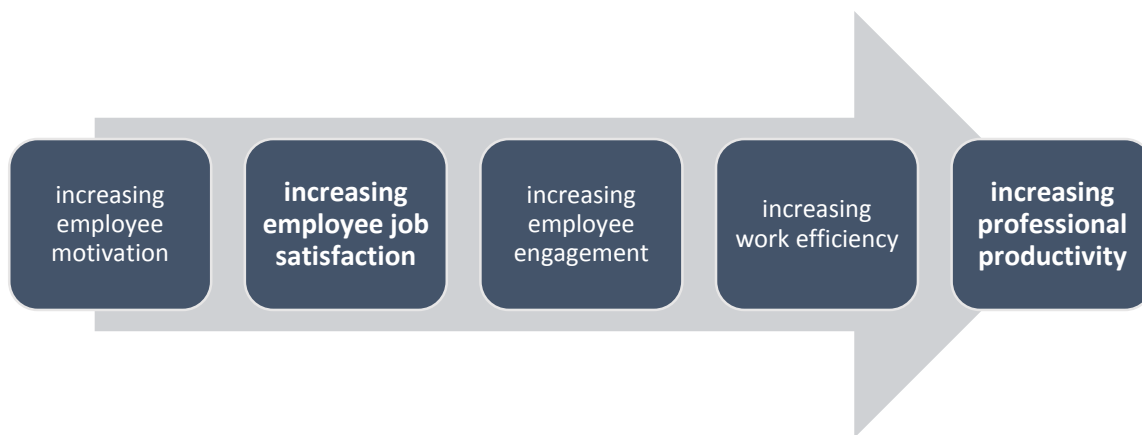
The article potentially provides employers, managers and HR professionals with practical tips and recommendations that can help improve performance in organisations by better understanding and managing employee motivation and job satisfaction.

The article is divided into several key sections: introduction, research methodology, results, discussion and summary. The introduction outlines the background and significance of the study, the research method describes how the survey was conducted and how the data was analysed, the results present the data collected and their interpretation, the discussion addresses the relationships found and their implications, and the summary offers conclusions and practical recommendations for employers, managers and HR professionals.

## 2. Methods

### 2.1. Research background

The relationship between job satisfaction and employee performance is clear and largely depends on the motivational system used in the organisation (Białas et al., 2023). Thus, the main goal of managers is to get employees to perform in line with management's strategy and expectations (Stefańska, Grabowski, 2023; Balik, Graczyk-Kucharska, 2022). This relationship can be graphically represented as a process (Figure 1):



**Figure 1.** The relationship between job satisfaction and employee performance - a process diagram.

Source: own compilation based on: Juchimowicz, Tomaszuk, 2018. The system of non-wage motivation in the National Fire Service.

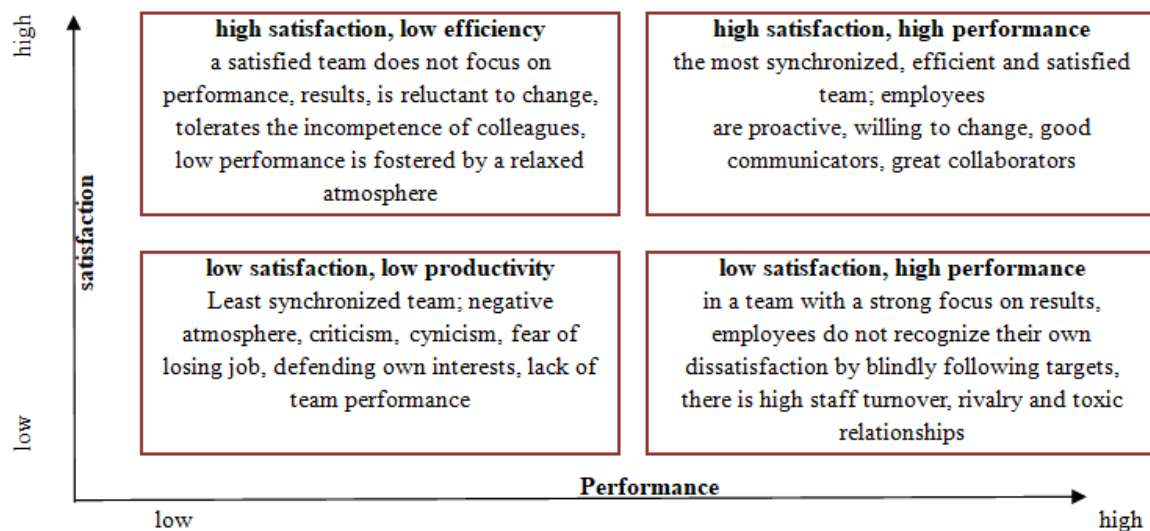
The first element of the process is to influence the level of employee motivation. Increasing staff motivation has a direct impact on increasing their job satisfaction, which allows them to freely use their potential to properly carry out their tasks. This, in turn, has a direct impact on the identification of employees with the organisation and the activities undertaken as part of their professional duties, which results in an increase in their work efficiency, thereby influencing an increase in professional productivity (Bodziany et al., 2021).

The essence of work engagement as a decisive element of employee performance is that it is directly linked to motivation, which stimulates the desire to perform work duties, but at the same time to the satisfaction the employee derives from it (Schultz, Kranas, 2011; Doniec, 2022). Through a high level of commitment, the employee shows his or her value not only as part of the organisation, but as a human being in the social system (Brajer-Marczak, 2021). An engaged person very often devotes a lot of time to his or her work: he or she spends extra hours at the workplace or 'takes' work home with him or her. A committed person is often always active and ready for new challenges, which from the perspective of the whole organisation means a source of profit, but also exemplifies exemplary work to other employees (Berlowski, 2004; Bejma, 2015). Management looks for such committed, productive employees as they represent a profitable investment for the organisation, and in return offer them a variety

of benefits and privileges to 'compensate' for the lack of all non-work activities (Berłowski, 2004; Beck-Krala, Kornik, 2023). Unfortunately, from an employee's perspective, this can mean rapid job burnout associated with overwork, exhaustion and a decline in productivity and the ever-present pressure to succeed and perform at a high level (Kraus, 2008).

In terms of the management of the work team and the relationship between employee satisfaction and performance, the literature points to a system of so-called 'four quadrants', the identification of which in the team makes it possible to assess the stage it is currently in (Chuda, Wyrwicka, 2013).

These quadrants are formed between satisfaction and productivity/performance. Their relationships are shown in Figure 2.



**Figure 2.** 'Four quarters' stage of the staff team.

Source: Clock, R., Lewczak, E. (2018). *The manager's journey: an illustrated guide to engaging work with your team*. Słowa i Myśli Publishing House, Lublin.

The leader's correct identification of the stage of his or her team will allow appropriate corrective mechanisms to be adapted and weaker aspects of the team's performance to be influenced (Wilczynski, 2023). The leader's goal should be to build a team characterised by both high satisfaction and high performance (Majczyk, 2022).

Pointing to job satisfaction as an element of improving job performance, it is impossible not to acknowledge that it has a direct impact on the level of an employee's involvement in the duties performed (Szczucka et al., 2023). This is because it is natural that a person who is satisfied and fulfilled professionally will make every effort to perform the tasks entrusted to him/her, also due to the fact that they give him/her pleasure (Janeczek, 2022).

Summarising the issue of motivation, it can be stated that it is a state that determines a certain readiness of a person to undertake some action aiming at the realisation of an intended goal, the satisfaction of a desire. According to humanistic theory, motivation is a set of motives influencing a person's decision to undertake a behaviour, maintain it or refrain from it. It is the stimulus that gives direction to human action. An unsatisfied desire. In the field of human

resource management, on the other hand, it is the element that determines the direction, but also the sustainability, of the actions taken by an employee team.

## 2.2. Research method

The methodology of own research on theories of employee motivation in the context of the relationship between motivation, performance and job satisfaction is closely related to the study group of employees, which is diverse, especially in terms of the industry in which they are employed. In order to do so, a theoretical objective and an empirical objective were distinguished.

The main objective of the article is to identify theories of employee motivation in the context of the relationship between motivation, performance and job satisfaction, taking into account how employees manage their team, job satisfaction and their job performance in the industries studied.

Based on the above, the research hypotheses were defined, viz:

1. It is assumed that the level of job satisfaction influences the level of employee performance.
2. It is assumed that the level of occupational motivation influences the level of employee performance.
3. It is assumed that the type of motivating factors interacts with the level of professional performance.

To achieve the main objective of the research, a diagnostic survey was used, which allows the opinion of a representative group of respondents to be collected on a specific topic in a random manner. When considering the occupational environment, the target group of respondents was not narrowed down, allowing the opinions of employees from different fields of work and areas of employment to be gathered.

As part of the research method of the diagnostic survey, a survey technique was used. The research technique is a specific way or ability to use selected research methods in order to find out the characteristics of the research subject. In this study, the research subject was the level of motivation, productivity and job satisfaction of employees. The research tool resulting from the method used was a survey questionnaire.

The survey questionnaire was aimed at those in active employment. Its implementation took place in January/February 2024. No issues were reported during the survey. 140 survey questionnaires were distributed. After all the sheets were collected, missing answers were noted which disqualified 6 survey questionnaires. In the end, the statements of 134 respondents were analysed.

The general characteristics of the study population of 134 people included basic socio-demographic characteristics, i.e. gender, age, length of service, level of education, type of work performed, mode of work and size of the company employing the respondents, but the most significant characteristic of this group was the industry of employment, as shown in Table 1.

**Table 1.***Characteristics of the study population in terms of employment sector*

| <b>Sector of employment of respondents:</b> |                      |     |      |
|---|----------------------|-----|------|
|   | Trade (H)            | 32  | 24%  |
|   | Health care (HIA)    | 14  | 10%  |
|   | Education (E)        | 17  | 13%  |
|   | Industry (P)         | 23  | 17%  |
|   | Beauty industry (BB) | 20  | 15%  |
|   | IT                   | 11  | 8%   |
| Other (I)                                   | Building             | 6   | 4%   |
|   | Transport            | 9   | 7%   |
|   | Finance              | 1   | 1%   |
|   | Other                | 1   | 1%   |
|   | SUMA                 | 134 | 100% |

Source: own elaboration based on survey.

Those surveyed were dominated by workers employed in the retail industry - 24%. A slightly smaller group of respondents were those employed in the industrial branch - 17% and the beauty industry - 15%. The fewest respondents came from the financial industry - 1%. In order to be able to present the full results of the survey, several branches of employment with the smallest number of respondents were combined, i.e. construction, transport, finance and 1 person who did not indicate their branch (17 people in total).

In the present survey, the participation of representatives of various professional sectors was recorded. The most numerous group were representatives of trade. Trade means selling, exchanging goods or services for money, but also for other goods or services. The primary purpose of trade is to make a profit and the indirect purpose is to provide necessary goods or services to consumers. The second largest group of respondents was industry. The general understanding of the field of industry as one of the sectors of the state economy consists of a process based on extracting resources from nature and adapting them to human needs, although this process is carried out on a large scale and concerns rather huge undertakings. The division of industry takes into account a number of sectors, such as the steel, fuel, chemical, food, clothing and glass industries. The third largest group of respondents were employees in the beauty industry. This industry has so far not been regulated in any way, but a number of measures have been taken at the Ministry of Finance in 2024, regulating, among other things, the definition of this sector of activity. The industry includes, for example, hairdressing, eyelash styling, permanent make-up, manicures, pedicures, nail styling and podiatry, as well as massages or depilation.

More than a dozen representatives from the education sector, which includes nurseries, kindergartens, schools, as well as any colleges and organisations involved in skills development, including vocational qualifications, also participated in the surveys.

Another industry whose participation was recorded in the own research was health care. This is an important sector of the state economy, focused on ensuring the health of Polish citizens, responding to illnesses, health problems or life-threatening emergencies, but also educating and taking care of disease prevention. Another group of respondents were workers in

the IT industry, commonly known as IT. These workers are usually IT specialists, programmers, closely related to the functioning of computers, software, but also applications or even games. In addition, the own research noted the low participation of representatives from the transport and construction industries as sectors relevant to the viability of any industries discussed earlier.

Women slightly dominated among the respondents - 54% against 46% men. Women dominated especially in the beauty industry, but also in the education industry. The smallest number of women was recorded in IT and industry. Men dominated the trade and industry sector. The education sector had the smallest proportion of men, while no men were recorded in the beauty industry. Respondents were also relatively young, with the highest number of people under 30 recorded at 28%, followed by those aged 31-40 (27%) and those aged 41-50 (20%). The least number of respondents were the oldest, i.e. over 61 years of age, at 10%, while those aged between 51 and 60 years were 15% of those surveyed.

Among respondents under the age of 30, those in the beauty industry in particular dominated, while the oldest respondents were recorded in the retail industry, with an age range of both 51 to 60 and employees over 61. Employees surveyed most often acknowledged that their work combined elements of both physical and mental work (56%). Only physical work was performed by 25% of respondents, while only mental work was performed by 19% of respondents. Respondents indicated the mode of their work. More than half of them, 54%, admitted that their work is carried out in shifts. Fixed and defined working hours were held by 16% of the respondents, mobile working hours were defined by 17% of the respondents, while irregular working hours were indicated by 13% of the people.

The final characteristic of the respondents was the size of the organisation in which they were employed. Almost half, 49%, indicated a large enterprise with more than 250 employees. A slightly smaller enterprise, i.e. between 50 and 249 employees, employed 31% of the respondents. A small enterprise employed 16% of respondents, while a micro enterprise was formed by 4% of respondents.

### **3. Results and Discussion**

An important issue addressed in the present survey research was that of job satisfaction as an element in improving job performance. This issue was pursued in our own research with several scales, which made it possible to reliably determine the degree of job satisfaction of the employees surveyed.

Table 2 shows the degree of satisfaction of the surveyed employees with their own work, taking into account the industry of employment of the respondents.

**Table 2.***Degree of satisfaction of surveyed employees with their own work by industry of employment*

| Degree of satisfaction of respondents with their work |            |          |
|---|------------|----------|
| 1 - low   | 2 - medium | 3 - high |
| Commercial sector (H)                                 |            |          |
| 4 (13%)   | 21 (66%)   | 7 (22%)  |
| Healthcare industry (HIA)                             |            |          |
| 7 (50%)   | 6 (43%)    | 1 (7%)   |
| Education sector (E)                                  |            |          |
| 6 (35%)   | 10 (59%)   | 1 (6%)   |
| Industry sector (P)                                   |            |          |
| 1 (4%)  | 10 (43%)   | 12 (52%) |
| Beuat branch (BB)                                     |            |          |
| 0 (0%)  | 5 (25%)    | 15 (75%) |
| Information technology (IT) industry                  |            |          |
| 0 (0%)  | 5 (45%)    | 6 (55%)  |
| Other sectors (I)                                     |            |          |
| 1 (6%)  | 8 (47%)    | 8 (47%)  |
| Total   |            |          |
| 19 (14%)  | 65 (49%)   | 50 (37%) |

Source: own elaboration based on survey.

Among all the people surveyed, the most frequent response was to indicate a medium level of satisfaction with their job - 49% of responses. However, every third person indicated a high level of job satisfaction with 37%, while the smallest number of respondents, 14%, were least satisfied. Determining the level of job satisfaction of respondents by industry of employment, the beauty industry is indicated first and foremost, with the highest level of job satisfaction - 75%. The highest satisfaction rate of respondents was also recorded in the IT industry, 55%, and the industrial industry, 52%. When it comes to the dominance of the average level of satisfaction of respondents, the retail industry in particular is indicated with 66%, and the education industry with 59%. The lowest level of satisfaction was recorded by far in the healthcare industry, 50%, but also the education industry, 35%.

The element analysed in this study was employee performance, which is also one of the elements of contemporary human resource management. This aspect is linked to the level of motivation and job satisfaction.

Table 3 shows the level of professional effectiveness of the employees surveyed, taking into account the industry of employment of the respondents.

Almost half of the employees surveyed were among those described as effective - 46%. Every third person showed a high level of effectiveness - 37%, while the smallest group of respondents, 17%, was described as ineffective. Determining the level of professional effectiveness of employees with regard to the industry of employment, one points first to the beauty industry, which was clearly dominant in terms of high levels of effectiveness - 80%. The second most effective industry, but with a much lower score, was the retail industry, which received 41% of responses.

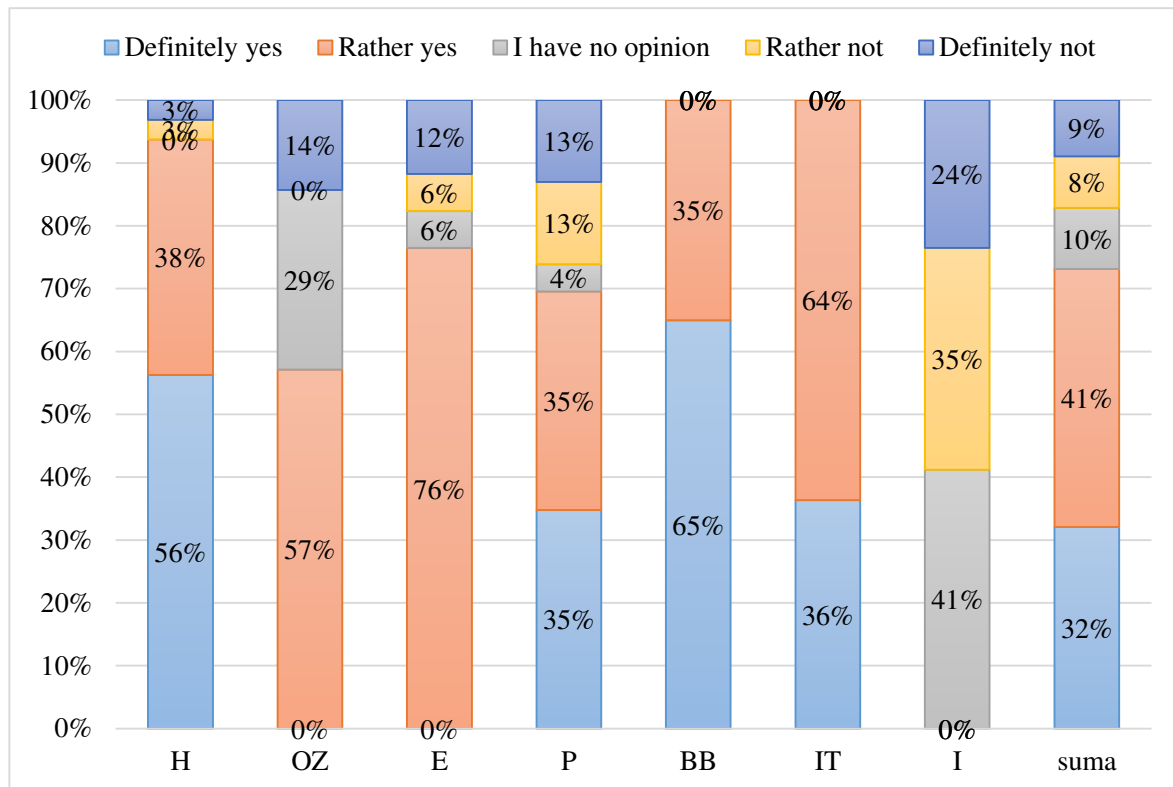


**Table 3.***Level of occupational efficiency of surveyed workers by industry of employment*

| <b>Level of professional effectiveness of employees surveyed</b> |           |                |
|--|-----------|----------------|
| Ineffective  | Effective | Very effective |
| Commercial sector (H)  |           |                |
| 0 (0%)   | 19 (59%)  | 13 (41%)       |
| Healthcare industry (HIA)  |           |                |
| 4 (29%)  | 7 (50%)   | 3 (21%)        |
| Education sector (E)   |           |                |
| 3 (18%)  | 11 (65%)  | 3 (18%)        |
| Industry sector (P)  |           |                |
| 4 (17%)  | 13 (57%)  | 6 (26%)        |
| Beuat branch (BB)  |           |                |
| 0 (0%)   | 4 (20%)   | 16 (80%)       |
| Information technology (IT) industry                             |           |                |
| 0 (0%)   | 7 (64%)   | 4 (36%)        |
| Other sectors (I)  |           |                |
| 12 (71%)   | 1 (6%)    | 4 (24%)        |
| Total  |           |                |
| 23 (17%)   | 62 (46%)  | 49 (37%)       |

Source: own elaboration based on survey.

In terms of the average level of efficiency, the education industry was predominant with 65%, the IT industry with 64%, the retail industry with 59% and the industrial industry with 57% of responses. Employees from other industries were primarily identified as ineffective, 71%, but also staff employed in the healthcare industry, 29% of responses. The next two questions of the survey questionnaire, which asked about the relationship between motivation and performance and satisfaction and performance, provided a summary of the issues addressed by the respondents. The question of the relationship between motivation and performance is presented in Figure 3.



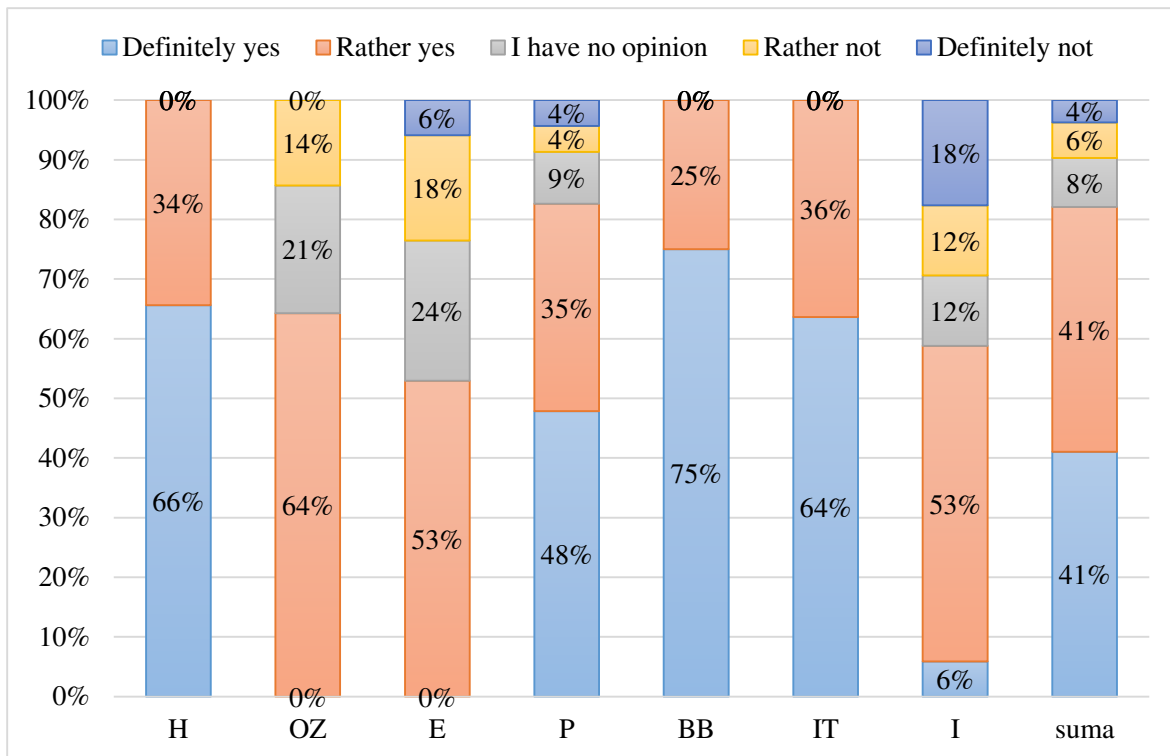
**Figure 3.** Relationship between motivation and job performance according to respondents.

Source: own elaboration based on survey.

The vast majority of respondents, 73% in total, agreed that there was a link between motivation and professional performance. A total of 17% of respondents held the opposite view, while 10% had no opinion in this regard.

Employees from the beauty and IT industries were strongly convinced that there is a link between motivation and job performance, but also, although to a lesser extent, sales representatives. Representatives of other industries in particular, but also health care personnel, were of a completely different opinion. Employees from these two industries were also the most likely to evade giving an answer.

The issue of the relationship that exists between satisfaction and professional performance is illustrated in Figure 4.



**Figure 4.** Relationship between job satisfaction and job performance according to respondents.

Source: own elaboration based on survey.

The vast majority of respondents, 82% in total, agreed that there is a link between motivation and professional performance. A total of 10% of respondents held the opposite view, while 8% had no opinion in this regard. Taking into account employees' responses by industry, it is indicated that the representatives of the retail, beauty and IT industries were again convinced of the link between satisfaction and professional performance. Again, representatives of health care, other industries, but also employees from the education industry were of a different opinion. The final question of the survey questionnaire asked the surveyed employees to indicate, in their opinion, the factors that contribute more to higher employee performance – Table 4.

**Table 4.***Factors influencing higher professional performance according to respondents*

|   |     |     |   |
|---|-----|-----|---|
| A supervisor who limits an employee's autonomy                                    | 51% | 49% | A superior who allows everything                        |
| Flexible working hours  | 40% | 60% | Rigid working hours                                     |
| Financial motivation  | 68% | 32% | Non-financial motivation                                |
| Individual work   | 46% | 54% | Group work, teamwork                                    |
| The lower bonus received each month   | 56% | 44% | High bonus received once a year                         |
| Sense of satisfaction of customer, client satisfaction                            | 51% | 49% | Sense of satisfaction of completing a professional task |
| Piecework   | 54% | 46% | Unlimited time for the performance of tasks             |
| Having free time outside of work (being offline)                                  | 56% | 44% | Having continuous contact with the employer             |
| Working in so-called "open space"   | 31% | 69% | Working in a separate room                              |
| The possibility of benefiting from specific rules for the performance of the task | 42% | 58% | Ability to creatively solve a task                      |

Source: own elaboration based on survey.

There was little advantage in many of the factors assessed; the responses were comparable to each other. However, an obvious choice was made against four factors. These were: 69% of the responses - working in a dedicated room, 68% of the responses - financial motivation, 60% of the responses - rigid working hours and 58% of the responses - being able to solve a task creatively.

In summary, the respondents provided their opinions in a series of questions concerning their perception of their professional work, their level of satisfaction with this work, their motivating factors and their level of work motivation. Obtaining these opinions makes it possible to draw first conclusions about the relationship between motivation, performance and job satisfaction. Indeed, it is indicated that employees who are characterised by higher levels of job satisfaction and motivation also present themselves as more professionally productive.

The above preliminary conclusions on the interrelationships between the factors in question should be properly interpreted using appropriate statistical tests, by which statistical significance, and therefore a real relationship occurring between the variables under study, is determined. A number of basic relationships will be verified in this way, as outlined in the following subsections.

#### 4. Summary

Research into the impact of job satisfaction and motivation on employee performance has been conducted on a large scale, covering a range of industries and company sizes. Although the results provided valuable information, some limitations must be taken into account. First of all, the research sample was not evenly distributed in terms of industry representation, which

may have affected the diversity of the data. Additionally, the self-reporting methodology may have introduced an element of subjectivity, which is typical of survey-based research.

Research has confirmed that there is a significant relationship between job satisfaction and employee performance, which is strongly dependent on the effectiveness of the motivational systems used in organisations. It has also been shown that high levels of motivation lead to higher commitment and higher productivity, which is a valuable contribution to human resource management theory.

The results obtained have important implications for human resource management practices. Employers and managers can use the information to develop more effective motivational strategies that will lead to increased job satisfaction and thus increased employee productivity. The research can also serve as a basis for further analysis, including research on the long-term impact of motivation and satisfaction on organisational success.

The theoretical implications of the research point to the need to take into account the complex relationships between different aspects of motivation and job satisfaction. Practical recommendations, on the other hand, include the development of professional development programmes and the implementation of innovative motivational systems, which can be key to increasing job performance in different sectors of the economy.

## References

1. Balik, A., Graczyk-Kucharska, M. (2022). Improving the motivational system of transport company employees. *Zeszyty Naukowe Politechniki Poznańskiej. Organisation and Management*.
2. Beck-Krala, E., Kornik, R. (2023). Remuneration system modification as a consequence of organizational culture change. *Human Resource Management, 151(2)*, 45-58.
3. Bejma, U. (2015). Work as a value in human life. Selected aspects. *Scientific Periodical of the Polish Academy, 4*, 48-73.
4. Bera, A. (2020). The importance of organisational culture for the motivation of employees in the National Fire Service. *Entrepreneurship and Management, 21(1)*, 31-46.
5. Berlowski, P. (2004). Companies like sects. *Personnel and Management, 4*, 23-26.
6. Białas, S., Molek-Winiarska, D., Pelc, A. (2023). Organisational culture to foster employee well-being. *Human Resource Management, 150(1)*, 73-93.
7. Bodziany, M., Ścibiorek, Z., Ślusarczyk, S. (2021). Motivating in theory and practice of command-case study of the Polish armed forces, the police and the fire service. *International Journal of Organizational Analysis, 29(2)*, 474-492.
8. Brajer-Marczak, R. (2021). *Employee involvement in business process improvement* (No. 308). Publishing house of the Wrocław University of Economics.

9. Chuda, A., Wyrwicka, M.K. (2013). Diagnosis of the organisational culture of a service enterprise. *Zeszyty Naukowe Politechniki Poznańskiej. Organization and Management*, 59, 5-17.
10. Clock, R., Lewczak, E. (2018). *The manager's journey: an illustrated guide to engaging work with your team*. Lublin: Słowa i Myśli Publishing House.
11. Clock, R., Lewczak, E. (2018). *The manager's journey: an illustrated guide to engaging work with your team*. Words and Thoughts Publishing.
12. Czechowska-Bieluga, M. (2021). Achievement motivation versus social workers' readiness to change. *Social Work*, 36(3), 69-83.
13. Doniec, K. (2022). Professional engagement of architects. *Education of Economists and Managers*, 66(4).
14. Janeczek, U. (2022). Persuading the value of social media users: addressees of corporate marketing communications-selected issues. *Marketing. Concepts and Experiences*, 188.
15. Juchimowicz, D., Tomaszuk, A. (2018). System motywacji pozapłacowej w Państwowej Straży Pożarnej, *Akademia Zarządzania*, 2(3).
16. Kozłowski, W. (2017). *Motivating employees in an organisation*. CeDeWu.
17. Kraus, A. (2008). Data collection and analysis system as a factor for intellectual capital development in quality management. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 31 (Personnel management as a criterion of excellence), 215-224.
18. Majczyk, J. (2022). Instrumentation of the leadership development programme manager: measures of success. *e-mentor*, 93(1), 46-53.
19. Polkowska, D. (2024). Autonomous or controlled? On the motivation of platform workers in the on-demand work system in Poland. *Qualitative Sociology Review*, 20(1), 102-123.
20. Rogowska, D. (2020). Motivating employees in organizations-selected aspects. *Challenges and educational and professional dilemmas*, 57.
21. Schultz, S.E., Kranas, G. (2011). *Psychology and the challenges of today's work*. PWN Scientific Publishers.
22. Stefańska, M., Grabowski, G. (2023). Employee engagement and job satisfaction in remote working environments. *e-mentor. Scientific Journal of the Warsaw School of Economics*, 98(1), 13-21.
23. Steinerowska-Streb, I., Wronka-Pośpiech, M. (2022). Motivating employees in the digital age. *Human Resource Management*, 146(3-4), 56-70.
24. Szczucka, E., Roman, M., Rusinowski, Z. (2023). Determinants of practicing physical recreation by SGGW students. SGGW Publishing House.
25. Wilczyński, A. (2023). Leader skills building employee engagement during a pandemic. *Modern Management Systems*, 18(2), 47-62.
26. Wojciechowska, M., Kaminska, J., Zolędowska-Król, B., Jaskowska, B. (2019). *Lexicon of management and marketing in library science*. SBP Scientific and Educational Publishing.

## FUNDING FOR SMES IN THE FRAMEWORK OF THE CRISIS SHIELD: SUPPORT FROM DISTRICT LABOUR OFFICES

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**Purpose:** The purpose of this article is to analyze the effectiveness of financial support for small and medium-sized enterprises (SMEs) provided by the Poviats Labour Offices (PUPs) in the Silesian Voivodeship under the Polish government's Anti-Crisis Shield during the COVID-19 pandemic.

**Design/methodology/approach:** The study employs secondary data analysis, collecting and processing existing data from all 32 Poviats Labour Offices in the Silesian Voivodeship. The research involved statistical analysis of the types, amounts, and success rates of the financial support measures to evaluate their effectiveness.

**Findings:** The findings indicate that the Anti-Crisis Shield significantly helped SMEs in the Silesian Voivodeship to sustain their operations and retain jobs. The majority of applications for support were processed efficiently, with a high percentage of approvals. The most common type of aid was one-off loans for covering ongoing business costs, reflecting the immediate need for liquidity among businesses.

**Research limitations/implications:** The study is limited to the Silesian Voivodeship and may not fully represent the effectiveness of the Anti-Crisis Shield in other regions. Future research could expand to other voivodeships to provide a more comprehensive evaluation of the program.

**Practical implications:** The results of this study can inform policymakers and public administrators on the critical factors that contribute to the successful distribution of emergency financial aid. It underscores the importance of efficient administrative processes and the need for clear communication channels between public institutions and SMEs. These insights can help improve the design and implementation of similar support programs in future economic crises.

**Social implications:** The research highlights the critical role of government intervention in mitigating the economic impact of the COVID-19 pandemic on SMEs. Effective distribution of financial aid helped stabilize the local economy and protected jobs, contributing to social and economic resilience during the crisis.

**Originality/value:** This article provides valuable insights into the practical implementation and outcomes of the Anti-Crisis Shield, emphasizing the collaboration between public institutions and SMEs. It serves as a case study for policymakers and business support organizations to develop strategies for future economic crises.

**Keywords:** financial support, Anti-Crisis Shield, SMEs, COVID-19 pandemic, economic impact, Poviats Labour Offices (PUPs), Silesian Voivodeship.

**Category of the paper:** Research paper.

## 1. Introduction

In the era of the COVID-19 pandemic, many small and medium-sized enterprises (SMEs) faced unexpected challenges that threatened their survival in the market (Brożek, 2022; Ligaj, Pawlos, 2021). To counteract the negative effects of the crisis, a crisis shield was created, offering various forms of financial support (Kucharski, Lekka-Porębska, 2023). One of the key elements of this shield are subsidies granted by the Poviats Labour Offices (PUP). Using the example of the Silesian Voivodeship, where PUPs actively support local companies, we will see how effectively they use the available funds to help SMEs maintain their businesses and jobs. In the article, we will present specific cases of companies that, thanks to the funding, have been able to survive a difficult period and continue to grow (Gródek-Szostak et al., 2022; Ziobrowska, 2021).

The anti-crisis shield is a set of tools and support programmes introduced by the Polish government in March 2020 in response to the COVID-19 pandemic (Powilan et al., 2020). Its aim was to protect the economy, businesses and jobs from the negative effects of the crisis (Stasiak, 2022). The main elements of the shield included the protection of jobs through subsidies and wage subsidies, financial support for enterprises, assistance to the health sector, support to local governments and the development of innovation and digitalization (Sokół, 2022; Wiśniewski, 2022). Using the example of the Silesian Voivodeship, where District Labour Offices actively supported local companies, it was shown how effectively the available resources were used to help small and medium-sized enterprises maintain their businesses and jobs.

The article potentially adds to the literature on the subject by providing information on how District Labour Offices (PUPs) in the Silesian Voivodeship effectively used funding from the anti-crisis shield to support small and medium-sized enterprises (SMEs) during the COVID-19 pandemic.

The article is intended to serve as a case study to illustrate how effective cooperation between public institutions and the private sector may have contributed to the stabilisation and development of the economy during the crisis. The article aims to familiarise readers with the mechanisms of the crisis shield and to illustrate the real impact of this support on the local economy.



## 2. Materials, research methodology

### 2.1. Research background

The COVID-19 pandemic posed a serious challenge to small and medium-sized enterprises (SMEs) in Poland, prompting the government to implement anti-crisis measures. These included financial support through various programmes and instruments aimed at maintaining employment and business liquidity (Kubiczek, Derej, 2022). Although diverse, some of these measures were complex, potentially hindering their effective use (Kubiczek, Derej, 2022).

The anti-crisis shield was a set of economic support measures implemented by the Polish government in response to the COVID-19 pandemic (Stańczyk, 2020). Its aim was to protect jobs and mitigate the negative economic effects of the crisis (Domanska, 2022). The shield included various instruments such as loans and subsidies for employers to maintain employment levels (Stańczyk, 2020; Domańska, 2022). Although it helped to reduce unemployment in some regions, such as Warmia and Mazury (Domanska, 2022; Sokół, 2022), some sectors, such as the transport industry, felt largely excluded from the benefits of the scheme (Ambrożewicz, 2021). These measures allowed many employers to survive the first six months of the epidemic and helped to limit the rise in unemployment (Latos-Milkowska, 2021). Overall, the Crisis Shield represented a significant state intervention in the economy during an unprecedented global crisis (Stańczyk, 2020).

Crisis shields were effective in mitigating the socio-economic crisis in regions such as Warmia and Mazury, as evidenced by unemployment trends (Domanska, 2022). District labour offices played a key role in supporting business start-ups, although the number of beneficiaries dropped significantly in 2020 (Buczak, 2023; Pancer-Cybulska, 2022). European funds, managed by institutions such as the Małopolskie Centrum Przedsiębiorczości, also contributed to supporting SMEs during the pandemic (Nyklewicz, 2020). In Małopolska, more than 8000 companies received support worth more than PLN 280 million in total, which helped maintain more than 30,000 jobs (Solecki, Kobis, 2023).

Within the framework of the crisis shield, the District Labour Offices offered 4 forms of financial support to SMEs (funding abbreviations adopted by the authorities):

1. Funding under 'ztc'. The addressees of the support were entrepreneurs who are natural persons without employees. In order to obtain support, an entrepreneur had to demonstrate a decrease in business turnover, which meant a decrease in sales of goods or services, both in terms of quantity and value. The decline in turnover was the basis for applying for a grant to cover part of the costs of doing business.

2. Funding under 'zzb' was intended for employees employed under various forms of contracts, including employment contracts, contracts to perform a specific task, contracts of mandate and other contracts for the provision of services. The subsidy was intended to cover part of the costs of employees' salaries, which was intended to help entrepreneurs maintain jobs and prevent redundancies.
3. Funding under 'zze' covered non-governmental organisations. This was a co-financing of part of the salary costs of staff employed by NGOs. The aim was to support the NGO sector in maintaining operations and jobs during the crisis.
4. The low-interest loan under the 'zzd' was targeted at micro-entrepreneurs. The purpose of the loan was to cover ongoing business costs to help the smallest companies survive the difficult pandemic period.

Each form of support was designed to help different groups of entrepreneurs and organisations, adapting to their specific needs and situations. Thanks to the variety of grants and loans offered, it has been possible to support a wide range of business and non-governmental actors, contributing to their stability and survival in the face of the challenges posed by the COVID-19 pandemic (Żyła, 2023).

## **2.2. Research method**

Secondary data analysis, also known as secondary data analysis, was used as the main research method. This method involves collecting and processing already existing data, which have been collected by various institutions or organisations, in order to draw conclusions and gain new information (Łobocki, 2000). In the context of the article on subsidies from the anti-crisis shield by Poviats Labour Offices (PUP) in the Silesian Voivodeship, data collected from all 31 Poviats Labour Offices in the Silesian Voivodeship were analysed. District Labour Offices in Śląskie Voivodeship are located in Będzin, Bielsko-Biała, Bytom, Chorzów, Cieszyn, Częstochowa, Dąbrowa Górnicza, Gliwice, Jastrzębie Zdrój, Jaworzno, Katowice, Kłobuck, Lubliniec, Mikołów, Mysłowice, Myszków, Piekary Śląskie, Pszczyna, Racibórz, Ruda Śląskie, Rybnik, Siemianowice Śląskie, Sosnowiec, Świętochłowice, Tarnowskie Góry, Tychy, Wodzisław Śląski, Zabrze, Zawiercie, Żory, Żywiec.

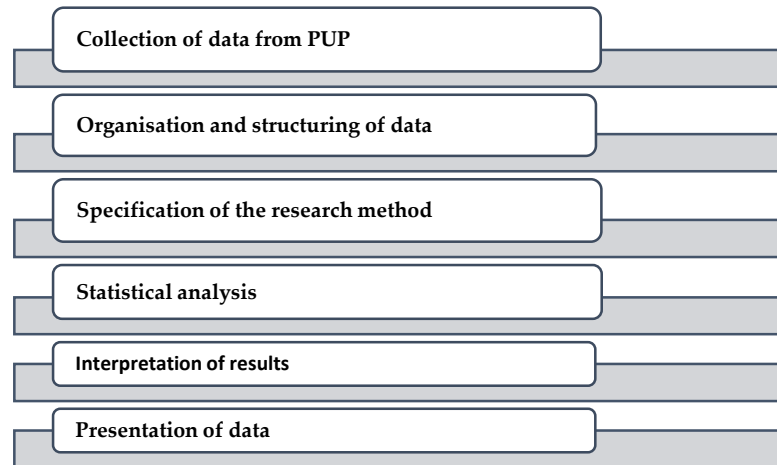
District Labour Offices collected data on the forms of support offered to entrepreneurs under the Anti-Crisis Shield for the duration of the programme, i.e. from March 2020 to June 2021.

The main objective of the study is to analyse the effectiveness of support for small and medium-sized enterprises (SMEs) by Poviats Labour Offices (PUP) in the Silesian Voivodeship in the context of the anti-crisis shield during the COVID-19 pandemic. The main objective adopted in this way influenced the separation of specific objectives:

An analysis of the various forms of financial support available under the crisis shield:

- evaluation of the effectiveness of measures taken by the PUPs in the Silesian Voivodship;
- provide practical information for entrepreneurs and local business development support institutions to prepare for a repeat of the pandemic.

In order to achieve the intended purpose of the work, the research process followed several steps (Figure 1):



**Figure 1.** The research process.

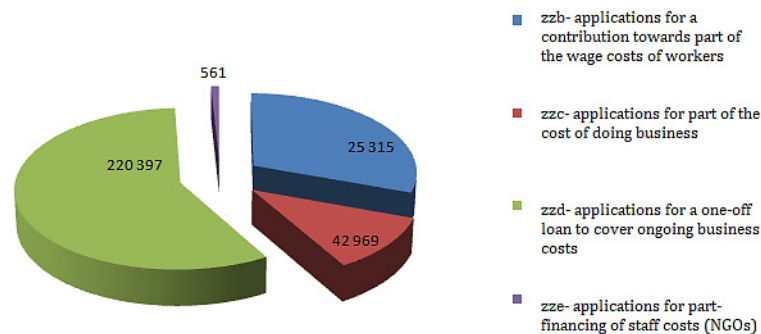
Source: own elaboration.

The first step in the research process was to collect data on financial support granted to small and medium-sized enterprises (SMEs) by PUPs in the Silesian Voivodship. The data included information on types of subsidies, amounts of funds granted and the number of beneficiaries. Data was obtained from 32 Poviats Labour Offices (PUPs) in the Silesian Voivodship, i.e. all offices located in the voivodship in question.

The collected data was then organised and structured to enable further analysis. This included the preparation of appropriate databases, tables and structures that allowed the information to be processed efficiently. In the next stage, the research method was defined. This was followed by the statistical analysis of the collected data. This analysis included data processing, statistical calculations and interpretation of the results in the context of the effectiveness of SME support. The results of the statistical analysis were then interpreted to understand the impact of financial support on SMEs. A case study analysis was conducted to identify specific benefits and challenges associated with the support received. The final step was the preparation and presentation of the research results. The data were presented in the form of graphs and tables to make them understandable and transparent to the readers. Conclusions and recommendations were formulated in a way that aims to provide practical information for entrepreneurs and local business development support institutions to be prepared in the event of a recurrence of a pandemic.

### 3. Findings and discussion

The number of applications received by the District Labour Offices within the framework of the Anti-Crisis Shield amounted to 289,242 (Fig. 2).



**Figure 2.** Number of applications received at District Labour Offices.

Source: own elaboration.

The largest number of applications (220,397) were for one-off loans to cover ongoing business costs, indicating a high demand for immediate financial support among businesses. The second most common type of application was for co-financing part of the costs of doing business (42,969), followed by co-financing part of the costs of employees' salaries (25,315). The smallest number of applications were submitted for co-financing part of the costs of employees' salaries in organisations such as associations or foundations.

Table 1 presents data on the number of applications submitted to PUPs in the Silesian Voivodeship and their processing.

**Table 1.**

*Number of applications submitted to the authority under the Crisis Shield*

| District Employment Office in | Number of applications received by the office | % of applications processed in number of applications submitted | Number of successful applications | % of successful applications in number of applications submitted |
|-------------------------------|---|---|-----------------------------------|--|
| Będzin                        | 8907  | 99,73%  | 8002                              | 89,84%   |
| Bielsko-Biała                 | 27412   | 100,00%   | 24537                             | 89,51%   |
| Bytom                         | 8074  | 100,00%   | 7277                              | 90,13%   |
| Chorzów                       | 6952  | 100,00%   | 6020                              | 86,59%   |
| Cieszyn                       | 13268   | 98,33%  | 11724                             | 88,36%   |
| Częstochowa                   | 24996   | 100,00%   | 23105                             | 92,43%   |
| Dąbrowa Górnicza              | 7522  | 100,00%   | 6831                              | 90,81%   |
| Gliwice                       | 19108   | 100,00%   | 17391                             | 91,01%   |
| Jastrzębie Zdrój              | 4078  | 100,00%   | 3563                              | 87,37%   |
| Jaworzno                      | 5479  | 100,00%   | 4920                              | 89,80%   |
| Katowice                      | 27099   | 100,00%   | 22643                             | 83,56%   |
| Kłobuck                       | 5931  | 100,00%   | 5688                              | 95,90%   |
| Lubliniec                     | 4673  | 99,76%  | 4447                              | 95,16%   |
| Mikolów                       | 6839  | 100,00%   | 6154                              | 89,98%   |
| Mysłowice                     | 4388  | 100,00%   | 3784                              | 86,24%   |

Cont. table 1.

|                             |               |               |               |               |
|-----------------------------|---------------|---------------|---------------|---------------|
| <b>Myshkos</b>              | 4789          | 99,85%        | 4129          | 86,22%        |
| <b>Piekary Śląskie</b>      | 2862          | 100,00%       | 2584          | 90,29%        |
| <b>Pszczyna</b>             | 6878          | 100,00%       | 6272          | 91,19%        |
| <b>Racibórz</b>             | 5202          | 99,75%        | 4921          | 94,60%        |
| <b>Ruda Śląska</b>          | 6524          | 99,94%        | 5796          | 88,84%        |
| <b>Rybnik</b>               | 11613         | 99,92%        | 10851         | 93,44%        |
| <b>Siemianowice Śląskie</b> | 3666          | 100,00%       | 3283          | 89,55%        |
| <b>Sosnowiec</b>            | 11183         | 99,80%        | 10211         | 91,31%        |
| <b>Świętochłowice</b>       | 2310          | 99,87%        | 2119          | 91,73%        |
| <b>Tarnowskie Góry</b>      | 9824          | 99,56%        | 8825          | 89,83%        |
| <b>Tychy</b>                | 12156         | 100,00%       | 10911         | 89,76%        |
| <b>Wodzisław Śląski</b>     | 8347          | 99,92%        | 7354          | 88,10%        |
| <b>Zabrze</b>               | 8889          | 100,00%       | 7869          | 88,53%        |
| <b>Zawiercie</b>            | 6491          | 100,00%       | 5907          | 91,00%        |
| <b>Zory</b>                 | 3923          | 100,00%       | 3495          | 89,09%        |
| <b>Żywiec</b>               | 9859          | 100,00%       | 8722          | 88,47%        |
| <b>Province</b>             | <b>289242</b> | <b>99,87%</b> | <b>259335</b> | <b>89,66%</b> |

Source: own elaboration.

The table presents data on the number of submitted and examined applications in various Poviats Labour Offices in the Śląskie Voivodeship. The total number of applications submitted to all offices is 289242, of which 288877 (99.87%) have been considered.

A total of 259335 applications were positively processed, representing 89.66% of all applications submitted. In all 32 districts, the number of applications processed was similar to the number submitted. In most districts, the success rate was above 90%. This means that the offices were largely granting benefits to people who met the required criteria and that the offices were efficiently keeping up with the processing of cases. The largest number of applications were received in large provincial cities (Katowice, Sosnowiec, Częstochowa), which may be related to the higher population and unemployment levels.

In smaller districts (Kłobuck, Lubliniec, Racibórz), a relatively high number of applications in relation to the number of inhabitants was recorded, which may suggest local labour market problems.

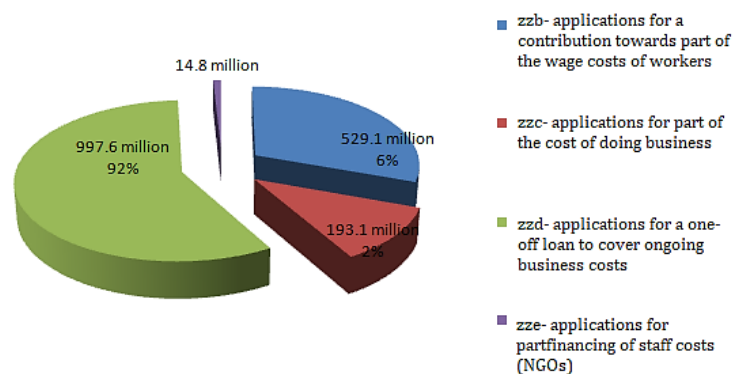
The highest percentages of successful applications were recorded in the districts of Kłobuck, Lubliniec and Racibórz. This may be due to less stringent criteria for applying for benefits or to the better labour market situation in these regions. The lowest percentages of favourable decisions were recorded in Katowice, Zabrze and Jaworzno. This may be due to the high competition for benefits in these large agglomerations or the specific structure of unemployment (e.g. high proportion of long-term unemployed).

An analysis of additional data showed that for subsidising part of the wage costs of employees (zsb) the total number of applications submitted was 25315, of which 99.79% were granted and 85.11% were successful. Of the applications for funding for part of the costs of doing business (zsc) 42969 applications were received, of which 99.54% were granted and 86.23% were successful. In contrast, 220397 applications were made for a one-off loan to cover ongoing business costs (zsd), of which 99.95% were approved and 90.89% were successful.

The number of applications for subsidising part of the wage costs of employees from NGOs (zze) amounted to 561, of which 99.47% were granted and 75.04% were granted.

It can therefore be concluded that most offices grant applications in around 85-90% of cases, indicating a high acceptability. The highest number of applications was received by the offices in Katowice (27,099), Sosnowiec (11,183) and Częstochowa (24,996). The highest percentage of positive responses was recorded in Kłobuck (95.90%), Lubliniec (95.16%) and Racibórz (94.60%). The lowest pass rates were recorded in Katowice (83.56%), Zabrze (88.53%) and Jaworzno (89.80%).

Typically have a lower percentage of successful applications (85.11%) compared to other categories. Applications zzd: Have the lowest percentage of successful consideration compared to other categories (75.04%), which may be due to the more restrictive criteria.



**Figure 3.** Amount of funding.

Source: own elaboration.

The figure shows the amount of subsidies paid out in PLN by Poviats Labour Offices, which totalled PLN 1 734 502 629.00. The largest part of the funds, PLN 997.6 million (92%), was earmarked for one-off loans to cover the current costs of economic activity. Subsequently, PLN 529.1 million (6%) was earmarked for co-financing part of the costs of employee salaries, and PLN 193.1 million (2%) for co-financing part of the costs of conducting business activity. The smallest amount, PLN 14.8 million, was earmarked for another programme to co-finance employee salary costs.

Table 2 presents financial data on subsidy payments by Poviats Labour Offices in different regions of Poland. The data is divided into several categories that represent different types of financial assistance.

**Tabela 2.**  
Amount of funding by district and form of funding

| District Employment Office in | Amount disbursed in PLN | zzb Requests for funding of part of the wage costs of employees | zzc Applications for funding of part of the cost of doing business | zzd - Applications for a one-off loan to cover ongoing business costs | zze Requests for funding of part of the wage costs of employees |
|-------------------------------|-------------------------|---|--|---|---|
| Będzin                        | 51466241,22             | 13393149,7  | 6291640  | 31569015,76   | 212435,76   |
| Bielsko-Biała                 | 157098483,9             | 40876932,43   | 20184580   | 95429130,05   | 607841,39   |
| Bytom                         | 46613437,06             | 12799583,14   | 5246040  | 28282257,91   | 285556,01   |
| Chorzów                       | 41385783,75             | 12997916,47   | 4335160  | 23200904,51   | 851802,77   |
| Cieszyn                       | 80790747,25             | 25652659,12   | 9845820  | 43002587,11   | 2289681,02  |
| Częstochowa                   | 155833301,2             | 45148218,87   | 16378270,77  | 90683910,42   | 3622901,14  |
| Dąbrowa Górnicza              | 45007089,83             | 13183012,01   | 4862140  | 26961937,82   | 0   |
| Gliwice                       | 120619937,5             | 39302198,95   | 12777140   | 67807094,32   | 733504,26   |
| Jastrzębie Zdrój              | 23475781,39             | 7790254,94  | 2975838,66   | 12702665,06   | 7022,73   |
| Jaworzno                      | 34711933,13             | 12626139,53   | 3888540  | 18016939  | 180314,6  |
| Katowice                      | 154026305,6             | 46161832,36   | 15339276,89  | 90380909,76   | 2144286,6   |
| Kłobuck                       | 35708481,46             | 9949839,78  | 4298700  | 21423336,32   | 36605,36  |
| Lubliniec                     | 32025533,82             | 10899730,74   | 3811660  | 16731086,62   | 583056,46   |
| Mikolów                       | 40687187,5              | 12274687,52   | 4527140  | 23787871,17   | 97488,81  |
| Mysłowice                     | 23028421,4              | 5495056,27  | 2519465  | 14987000  | 26900,13  |
| Myszkow                       | 31470103,05             | 12638023,87   | 2833520  | 15923003,06   | 75556,12  |
| Piekary Śląskie               | 17756583,79             | 6070513,44  | 1892220  | 9673337,76  | 120512,59   |
| Pszczyna                      | 43129659,7              | 15009952,02   | 4044320  | 23852314  | 223073,68   |
| Racibórz                      | 37091061,51             | 15277696,43   | 3922560  | 17860655,13   | 30149,95  |
| Ruda Śląska                   | 35940608,66             | 9439487,36  | 4311326,67   | 22164610,5  | 25184,13  |
| Rybnik                        | 72445914,54             | 22606594,01   | 7843960  | 41674222,75   | 321137,78   |
| Siemianowice Śląskie          | 21924568,42             | 6723880,26  | 2970560  | 12156306,2  | 73821,96  |
| Sosnowiec                     | 63417014,43             | 15890805,56   | 7155348  | 39917574,6  | 453286,27   |
| Świętochłowice                | 12317344,9              | 2417207,19  | 1628820  | 8250165,56  | 21152,15  |
| Tarnowskie Góry               | 59498059,51             | 18195601,26   | 6257240  | 34472588,54   | 572629,71   |
| Tychy                         | 71094278,16             | 22014911,09   | 7060320  | 41919845,96   | 99201,11  |
| Wodzisław Śląski              | 51942807,36             | 19383110,55   | 5702644,52   | 26565942,05   | 291110,24   |
| Zabrze                        | 55060457                | 18795880,4  | 6144760  | 29750367,19   | 369449,41   |
| Zawiercie                     | 37962325,35             | 11294956,89   | 4063280  | 22514334,67   | 89753,79  |
| Zory                          | 24368177,51             | 8654522,92  | 2803760  | 12904382,21   | 5512,38   |
| Żywiec                        | 56604999,08             | 16093419,46   | 7142600  | 33001170,86   | 367808,76   |
| <b>Province</b>               | <b>1734502629</b>       | <b>529057774,5</b>  | <b>193058650,5</b>   | <b>997567466,9</b>  | <b>14818737,07</b>  |

Source: own elaboration.

The total amount of co-financing paid out in all the regions mentioned amounted to PLN 1 734 502 629.

The highest amounts of subsidy paid out were observed in regions such as Bielsko-Biała, Katowice and Częstochowa. Applications for funding vary considerably from region to region and category to category, indicating the differing needs and economic activity in these areas. The total amount for co-financing part of the costs of employee remuneration (15zzb) was 529 057 774.5 PLN, co-financing part of the costs of business activity (15zcc): PLN 193 058 650.5. One-off loans were also disbursed to cover current costs of conducting business activity (15zzd) in the amount of PLN 997,567,466.9 and co-financing of employees' salary costs (15zce) in the amount of PLN 14,818,737.07.

The highest amounts of subsidies paid were in:

- Katowice: 154,026,305.60 PLN
- Bielsko-Biała: 157,098,483.90 PLN
- Częstochowa: PLN 155,833,301.20

In contrast, the lowest amounts of subsidies paid were recorded in:

- Świętochłowice: PLN 12,317,344.90
- Piekary Śląskie: PLN 17,756,583.79
- Jastrzębie-Zdrój: 23,475,781.39 PLN

Taking into account the categories of applications, the analysis showed that the highest amount of zzb funding was awarded to Katowice (46,161,832.36 PLN) and the lowest to Świętochłowice (2,417,207.19 PLN).

The situation was the same in obtaining subsidies for part of the costs of economic activity (zyc): the highest amount fell on Katowice (15,339,276.89 PLN) and the lowest on Świętochłowice (1,628,820 PLN) and in the allocation of funds from the zyc (One-off loan to cover current costs of economic activity). Katowice received PLN 90,380,909.76 and Świętochłowice PLN 8,250,165.56, which was also the lowest amount. Within the framework of subsidising a part of costs of salaries of employees from non-governmental organisations, the highest amount fell on Częstochowa (PLN 3,622,901.14) and the lowest on Jastrzębie-Zdrój (PLN 7,022.73).

The data shows that the largest financial support was granted in larger cities such as Katowice, Bielsko-Biała and Częstochowa, which is understandable given the number of businesses and employees in these regions. The least support was granted in Świętochłowice, Piekary Śląskie and Jastrzębie-Zdrój. Subsidising part of the costs of employees' salaries (category zyb) and one-off loans to cover ongoing costs (category zyd) accounted for the largest share of support granted. In contrast, subsidising part of the costs of doing business (category zyc) and additional support for wages (category zze) accounted for a smaller share, but were still a significant element of assistance to entrepreneurs in the region (Flaszyńska, 2021).

#### **4. Summary**

The research carried out, which analyses the amounts of subsidies paid out under various support programmes for entrepreneurs in individual Poviats Labour Offices in the Silesian Voivodeship, provides valuable information, but is not free of certain limitations and weaknesses. Firstly, the research does not take into account the local context and the specific needs of individual poviats, which may lead to incomplete interpretation of the results. For example, higher subsidy amounts in larger cities may be due not only to a higher number of businesses, but also to a higher number of applications and more complex economic



structures, which has not been fully explored. In addition, the lack of detailed data on the efficiency of the use of the allocated funds makes it difficult to assess the real impact of these subsidies on local economies.

The research found that the largest financial support was granted in larger cities such as Katowice, Bielsko-Biała and Częstochowa. This finding confirms that larger urban centres, with more developed economic infrastructure, receive proportionally more support, which may suggest a concentration of resources in more developed regions. On the other hand, smaller cities and counties, such as Świętochłowice and Piekary Śląskie, receive relatively smaller amounts, which may indicate the need for a more balanced distribution of resources.

The analyses are of significant theoretical as well as practical interest. From a theoretical point of view, they provide evidence of an uneven distribution of financial resources between larger and smaller urban centres, which should lead to further research into the effectiveness of business support policies. From a practical point of view, the results can serve as a basis for policy makers to develop more balanced resource allocation strategies that take into account the specific needs of smaller regions.

The research results clearly show that larger cities receive more financial support, which may lead to further centralisation of resources. Theoretically, this implies the need for further research into resource allocation mechanisms that can take into account not only the number of businesses, but also the specific needs of local economies. Practically, these findings can be used to develop more equitable support policies that ensure that smaller districts can also compete effectively for access to financial resources.

In future, it is planned to investigate the reasons for rejections, particularly in the zzd category as well as to find out what the differences in the percentage of successful applications in the various offices are due to.

## References

1. Ambrożewicz, J. (2021). Rola organizacji biznesowych i tworzonych tam relacji wspierających przedsiębiorców w radzeniu sobie z kryzysem podczas pandemii COVID-19. *Kultura i Edukacja*, 1(131), 219-236.
2. Brożek, K. (2022). Tarcza antykryzysowa wsparcie dla przedsiębiorstw w zwalczaniu kryzysu spowodowanego COVID-19.
3. Buczak, A. (2022). Pandemia COVID-19 a zakładanie działalności gospodarczej ze wsparciem powiatowych urzędów pracy w miastach na prawach powiatu. *Przedsiębiorczość-Edukacja*, 18(2), 108-144.

4. Domańska, L. (2022). Wsparcie pracodawców w dobie pandemii COVID-19. Analiza wybranych elementów warmińsko-mazurskiego rynku pracy. In: *Państwa i organizacji w obliczu kryzysów globalnych* (p. 117).
5. Flaszyńska, E. (2021). Daliśmy radę. Rynek pracy w rzeczywistości covidowej. *Rynek Pracy*, 176(1-2), 5-18.
6. Gródek-Szostak, Z., Adamczyk, J., Luc, M., Suder, M., Tora, J., Kotulewicz-Wisińska, K., Szelaż-Sikora, A. (2022). Hard cash in hard times—the effect of institutional support for businesses shaken by COVID-19. *Sustainability*, 14(8), 4399.
7. Kubiczek, J., Derej, W. (2021). Financial performance of businesses in the COVID-19 pandemic conditions—comparative study. *Polish Journal of Management Studies*, 24(1), 183-201. <https://doi.org/10.17512/pjms.2021.24.1.11>
8. Kucharski, A., Lekka-Porębska, I. (2023). Efektywność działań powiatowych urzędów pracy w zmniejszaniu bezrobocia w makroregionie centralnym Polski w 2021 roku. *Acta Universitatis Lodzianensis. Folia Oeconomica*, 2(363), 25-49.
9. Latos-Miłkowska, M. (2021). Zakres podmiotowy dofinansowania do wynagrodzeń pracowników wypłacanego ze środków Funduszu Gwarantowanych Świadczeń Pracowniczych w związku ze zwalczaniem skutków epidemii COVID-19. *Z Problematyki Prawa Pracy i Polityki Socjalnej*, 2(19), 1-22.
10. Ligaj, M., Pawlos, W. (2021). Wpływ COVID-19 na funkcjonowanie przedsiębiorstw w Polsce. *Gospodarka Materialowa i Logistyka*, 3, 60-65.
11. Łobocki, M. (2000). *Metody i techniki badań pedagogicznych*. Impuls.
12. Mamad, N.A. (2020). Survival strategies on Muslim small and medium enterprise (SME) owners during COVID-19. A study on tourism industry in Malacca. In: N.A. Wahab, M.Y. Isa (Eds.), *3rd UUM International Islamic Business Management Conference 2020 (IBMC 2020)* (p. 53). Sintok: Islamic Business School, Universiti Utara Malaysia.
13. Nyklewicz, K. (2020). Tarcza antykryzysowa w Małopolsce. *Rynek Pracy*, 175(4), 70-73.
14. Pancer-Cybulska, E. (2022). Polska gospodarka w warunkach pandemii COVID-19 na tle Unii Europejskiej. *Ekonomia—Wrocław Economic Review*, 28(4), 29-47.
15. Powilan, J., Pietrzak, P., Wiliński, B. (2020). Tarcza antykryzysowa oczyma przedsiębiorcy. *Biuletyn Producenta Pieczarek-Pieczarki*, 48(2).
16. Sokół, A. (2022). *Tarcza antykryzysowa jako instrument polityk publicznych wspierający pracowników w czasie pandemii Covid-19*.
17. Solecki, R., Kobis, R. (2023). Wpływ funduszy europejskich na rozwój przedsiębiorczości—rola Małopolskiego Centrum Przedsiębiorczości w wykorzystaniu funduszy europejskich w województwie małopolskim. *Przedsiębiorczość-Edukacja*, 19(2), 71-86.
18. Stanczyk, K. (2020). “Anti-crisis shield” as an example of state interventionism during the crisis caused by the Covid-19 virus pandemic in Poland.
19. Stasiak, J. (2022). The importance of anti-crisis shields in enterprise management in the era of COVID-19. *Globalization, the State and the Individual*, 29(1), 183-191.

20. Wiśniewski, Z. (2022). Wyzwania regionalnej polityki rynku pracy. In: *Zmiany demograficzne a rynek pracy i ubezpieczenia społeczne. Materiały z III Kongresu Demograficznego. Część 4* (pp. 11-25). Warszawa.
21. Ziobrowska, J. (2021). Wpływ pandemii COVID-19 na gospodarkę współdzielenia w Polsce. *Zdrowie i style życia: ekonomiczne, społeczne i zdrowotne skutki pandemii*. Wrocław University, DOI, 10, 142085.
22. Żyła, K. (2023). *Funkcjonowanie przedsiębiorstw a pomoc rządu w czasie pandemii-analiza porównawcza*. III Międzynarodowa Konferencja Studencka Powiślańskiej Szkoły Wyższej „Oblicza dobrobytu”, p. 39.



## RESOURCES AND COMPETENCIES IN THE FIELD OF R&D IN THE OPINION OF DAIRY COOPERATIVES FROM ŚWIĘTOKRZYSKIE AND MAŁOPOLSKIE VOIVODESHIPS

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**Purpose:** The aim of the paper is to identify the importance and the state of R&D resources and competencies of selected dairy cooperatives from Świętokrzyskie and Małopolskie voivodeships in comparison to their competitors.

**Design/methodology/approach:** Direct interviews using a questionnaire survey were conducted among representatives of cooperatives representing 41% of the population, which resulted from the willingness to participate in the survey.

**Findings:** Cooperatives are aware of the importance and the state of resources and competencies in the field of R&D in comparison with competition. The importance that cooperatives from two neighboring voivodeships, Świętokrzyskie and Małopolskie, place on the aforementioned resources and skills in the field of R&D, differs. Research and development strategic potential is in most indicated elements similar to that of competition.

**Originality/value:** The comparison of the importance and state of resources and competencies in the field of R&D of selected cooperatives from two different voivodships.

**Keywords:** resources, competencies, R&D, cooperatives.

**Category of the paper:** Research paper.

### 1. Introduction

The area of a business's activities known as research and development (R&D) looks for information to help it create, develop, and improve its technology, services, goods, or procedures. Investing in research and development not only creates new products but also enhances existing ones with new features, linking disparate aspects of a company's business plan and strategy. According to OECD research and experimental development (R&D) comprise creative and systematic work undertaken in order to increase the stock of knowledge – including knowledge of humankind, culture and society – and to devise new applications of available knowledge (OECD, 2015, p. 44). R&D creates breakthroughs and improves the

company's capacity to recognize, absorb, and use knowledge from environment (Cohen, Levinthal, 1989, p. 569). Traditionally, R&D has been viewed as a single function that focuses the company's efforts on creating new products and technologies. However, as time has gone on, this function has taken on many functions within the company and has been managed in various ways (Piachaud, 2004, p. 87). As Pisano indicates decisions made in 4 strategic levels: architecture, processes, people, and portfolio constitute the R&D strategy. The decisions made on the organizational and geographic structure of R&D are referred to as architecture. The official and informal methods used to do R&D are called processes. One of the most crucial components of an R&D system is people and their competencies. The term "portfolio" describes the intended distribution of resources among various R&D project kinds as well as the standards by which initiatives are arranged, given priority, and chosen (Pisano, 2012, pp. 3-5).

As it is seen the crucial role in activities connected with R&D play resources and competencies since without them, it is impossible to work in this field. Building a portfolio of business resources and integrating them to develop capabilities that will be utilized to generate and maintain value for owners and consumers is the holistic process of resource management.

Building a portfolio of business resources and integrating them to develop capabilities that will be utilized to generate and maintain value for owners and consumers is the holistic process of resource management (Sirmon, Hitt, Ireland, 2007, p. 273). An organization's resources are its strengths that it can utilize to develop and carry out strategy (Barney, 1991, p. 101) and to establish a situation where its resource position either directly or indirectly hinders competitors' ability to catch up to it (Wernerfelt, 1984, p. 173). Resources and skills must be rare, valuable, non-replaceable, and non-imitable (Bowman, Ambrosini, 2003, p. 291) in order to be considered an organization's strategic advantage (Lichtarski, 2001, pp. 37-38). An organization with strategic resources can gain an advantage over others since they create economic value, and resource-based benefits can be realized over an extended period of time because strategic resources are difficult to duplicate (Crook, Ketchen Jr., Combs, Todd, 2008, p. 1144). They are also advantageous to the organization since they are non-substitutable, meaning that other resources that have the same effect cannot simply replace them (Bowman, Ambrosini, 2003, p. 292). Therefore, the key task lies with the research and development sphere of the enterprise. That is why executives need to understand the value and current condition of R&D resources and competencies, though, in order to properly manage them for the growth of the organization as companies can establish a (long-term) competitive advantage by efficiently developing, utilizing, and (re-) allocating their resources (Barney, 1991). A company may perform better if it can allocate resources to certain innovative endeavors. Firms' competitive advantages are derived from the way they use their resources as well as from their unique resources (or the resources made available to them through internationalization) (Luo, 2004). The learning process that distinguishes such innovative activities is significantly influenced by R&D activities (basic research, applied research, and development) (OECD, 2015) and a company's competitiveness is created and maintained in large part by the competencies of its R&D

specialists. This is because the skills of R&D professionals that improve the organization's efficiency and efficacy in creating new goods and processes are crucial to a company's ability to maintain a competitive edge over time. As it was noticed by Wu (2009) most businesses constantly need qualified technical personnel to handle the effects of technological progress and systematic development of competencies provides organizations with a strategic advantage. Competencies determine the uniqueness of the enterprise, are challenging for competitors to replicate, and stem from the organization's ongoing learning and growth (Kossowska, Sołtysińska, 2002, p. 12). Therefore, the aim of the paper is to identify the importance and the state of R&D resources and competencies in the opinion of head managers of selected dairy cooperatives from Świętokrzyskie and Małopolskie voivodeships in comparison to their competitors. To achieve the goal, research questions and hypotheses were formulated.

RQ1: Are cooperatives aware of the importance and the state of resources and competencies in the field of R&D in comparison with competition?

RQ2: Is there any difference in assessing the importance of indicated resources and competencies in the field of R&D between cooperative from two neighboring voivodeships, namely Świętokrzyskie and Małopolskie?

RQ3: What is the strategic potential in the field of R&D of dairy cooperatives claimed to be in comparison to the competition?

H1: Cooperatives are aware of the importance and the state of resources and competencies in the field of R&D in comparison with competition.

H2: There is difference in assessing the importance of indicated resources and competencies in the field of R&D between cooperatives from two neighboring voivodeships, namely Świętokrzyskie and Małopolskie.

H3: Cooperatives' strategic potential in the field of R&D is claimed to be better than that of their competitors.

In order to achieve the goals, answer research questions and respond to the hypotheses, an analysis was carried out based on the results of direct interviews conducted with the help of the questionnaire.

The organization of this paper is as follows. The following section the framework of R&D' resources and competencies are presented. Research findings on the significance and state of resources and competencies in the R&D field of specific dairy cooperatives from the regions of Świętokrzyskie and Małopolskie Voivodeships are highlighted in Section 3. The fourth section provides a summary and refers the hypotheses.

## 2. The framework of R&D' resources and competencies

Businesses must introduce innovations more quickly due to the increased turbulence in the environment, which is demonstrated among other things by the notable shortening of product and technology life cycles (Gajdzik, Wolniak, 2022, p. 2). Increasing R&D and innovation stimulation may undoubtedly serve as a foundation for strengthening businesses' competitiveness both domestically and globally. Companies need to anticipate the demands of their customers in advance and prioritize research and development (Szopik, 2007, p. 294). Decisions on how to conduct research and development (R&D) are influenced by the R&D strategy of businesses, which is influenced by the overall strategy of the organization and other functional strategies within the company. The R&D strategy involves developing and executing decisions regarding the fundamental operations of the R&D department. These choices pertain to the effectiveness of the R&D division and the operational, managerial, and supportive procedures, including the technology (consisting of personnel, tools, and machinery) needed to execute these procedures (Kerssens-van Drongelen, de Weerd-Nederhof, Fisscher, 1996, p. 214). Every business must strategically consider whether to outsource a particular R&D project to an outside party or conduct it "in house" using staff, facilities, and equipment owned by the company. The goal is to maximize the return on investment for the resources devoted to the business's technology portfolio (Gutterman, 2023, p. 3). Research and development work is incorporated into the intangible assets of the company and as an individual, unique action aimed at achieving better results as a result of their implementation, it is the company's own product. Intangible assets, and therefore research and development work, are perceived as key competencies of the company (Turek, 2015, p. 214).

Managers also play a critical role. Research results indicate that managers place greater emphasis on competitive factors when making strategic decisions about research and development, particularly when facing strong competition from current rivals or potential new entrants and when they have achieved a leading market share (Cheng, Huang, Wu, 2023).

The correct and well-directed implementation of R&D activities depends on the resources and competencies available in this area. Very crucial in this area are resources and competencies such as (Stankiewicz, 2002, p. 119):

- Possession of own B&R units.
- Amount of the budget for R&D activities.
- Modernity of technical equipment of R&D units.
- Knowledge of staff employed in R&D activities.
- Cooperation with scientific and/or scientific and research institutions.
- The ability to create new products.
- The ability to create new technologies.
- The ability to anticipate changes in technique and technology.
- Degree of computerization of R&D works.



Resources that stimulate research and development are developed and acquired through the following processes (Walas-Trębacz, 2021, pp. 113-114):

- creating human capital (recruitment, training, self-training, and promotion),
- establishing the infrastructure for research and development, which includes design offices, patents, control and monitoring tools, research laboratories, R&D departments, etc.),
- creating IT systems with databases, expert systems, decision support systems, and information on rivals, suppliers, and customers, among other things,
- developing sets of internal and external standards, registers, process descriptions, instructions, and applicable laws for the business,
- forming task groups to complete both short- and long-term tasks (R&D work) and planning how they would operate,
- forming organizational structures, establishing lines of communication, gaining and disseminating information, enhancing expertise, etc., in order to shape the enterprise's structural capital,
- building a network of connections with outside organizations in order to collaborate on R&D projects,
- setting aside money for research and development.

Because they are vital to the processes of innovation, own R&D units and their activities are crucial to businesses. This is due to the following factors: 1. own ideas are implemented most successfully; 2. there is a direct correlation between an organization's research and development efforts and the innovations that emerge within it; and 3. when conducting R&D, businesses prioritize using their findings practically and tailoring them to the demands of the market (Jasiński, 2014, p. 66). The strength and availability of scientific cadres and talents that work in R&D units determines the potential to leverage new concepts to produce economically viable innovation. Therefore, developing talent's competence and expertise is vital to the ability to create and implement innovations widely (Sarpong, Boakye, Ofosu, Botchie, 2023, p. 3). However, R&D projects that are created in R&D units need the necessary funds to make any planned changes that will promote innovation (Jissink, Schweitzer, Rohrbeck, 2019) and extra care should be taken to provide sufficient funding for breakthrough innovation projects until they reach maturity and to allocate enough resources to defeat present and future competitors (de Jong, Marston, Roth, Biljon, 2013, p. 5). A company's innovation investments are positively affected by the level of diversification and the availability of internal funds. One of the most effective ways to encourage research and development efforts is by prioritizing the accumulation of internal funds instead of relying on debt instruments for capital. This involves taking a future-oriented approach to plan ahead for securing the funding needed to carry out a specific innovation strategy (Martínez-Ros, Tribo, 2005, p. 199). Firms that have ample internal financial resources can afford to take on riskier research projects with lower expected returns, as their financial reserves can provide a cushion in case these projects do not yield the

desired results. Having higher levels of internal financial resources can support extended investments in research activities, which can increase a company's intellectual breadth and improve its core capabilities. Ultimately, having ample internal financial resources can simplify the monitoring of a company's performance and allow research and development (R&D) employees to engage in non-core exploratory research initiatives (Perez-Alaniz, Lenihan, Doran, Hewitt-Dundas, 2022, pp. 193-194).

### 3. The Importance and State of Resources and Competencies in the Field of R&D – the research results

The study was conducted among dairy cooperative managers, who were asked to assess the importance and state of their R&D resources and competencies in comparison to their competitors. The research was conducted in dairy cooperatives from the Świętokrzyskie and Małopolskie voivodeships, representing 41% of the cooperatives in operation during the year of the study. A structured interview questionnaire was employed, with carefully selected questions in terms of number, content, form, and order. Tables 1 and 2, as well as Figures 1 and 2, were created based on the interview results.

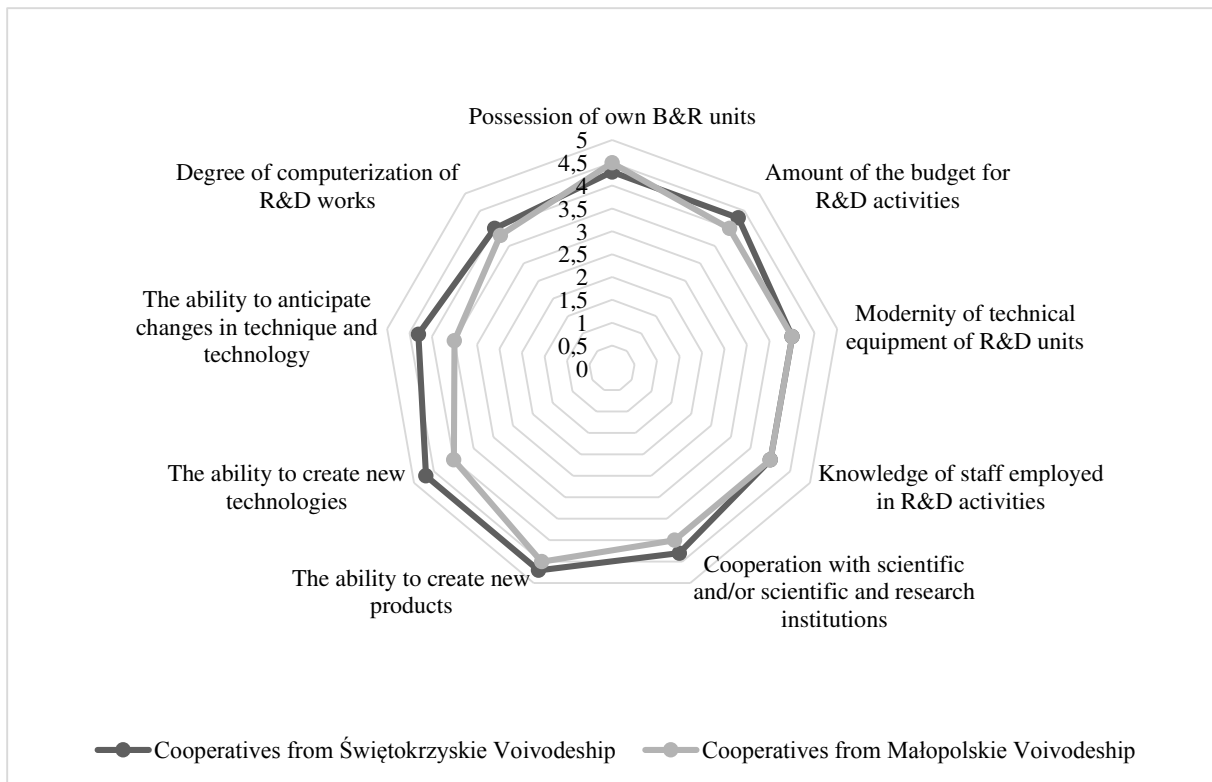
**Table 1.**

*The assessment of the validity of resources / competencies of dairy cooperatives in the field of R&D*

| Resources / competencies of cooperatives in the field of R&D            | Cooperatives from Świętokrzyskie Voivodeship | Cooperatives from Małopolskie Voivodeship | Mean        |
|---|--|---|-------------|
| Possession of own B&R units   | 4.3  | 4.5                                       | <b>4.40</b> |
| Amount of the budget for R&D activities                                 | 4.3  | 4.0                                       | <b>4.15</b> |
| Modernity of technical equipment of R&D units                           | 4.0  | 4.0                                       | <b>4.00</b> |
| Knowledge of staff employed in R&D activities                           | 4.0  | 4.0                                       | <b>4.00</b> |
| Cooperation with scientific and/or scientific and research institutions | 4.3  | 4.0                                       | <b>4.15</b> |
| The ability to create new products                                      | 4.7  | 4.5                                       | <b>4.60</b> |
| The ability to create new technologies                                  | 4.7  | 4.0                                       | <b>4.35</b> |
| The ability to anticipate changes in technique and technology           | 4.3  | 3.5                                       | <b>3.90</b> |
| Degree of computerization of R&D works                                  | 4.0  | 3.8                                       | <b>3.90</b> |
| <b>Mean</b>   | <b>4.29</b>                                  | <b>4.03</b>                               |             |

Rating scale: 5 – extremely important, 4 – very important, 3 – quite important, 2 – little important, and 1 – completely unimportant.

Source: own work and (Konieczna, 2017).



**Figure 1.** The assessment of the validity of resources / competencies of dairy cooperatives in the field of R&D.

Source: own work.

Taking into account the assessment of the validity of resources/competencies of dairy cooperatives in the field of R&D (Table 1 and Figure 1) it is seen that:

- extremely important for cooperatives from both voivodeships is the ability to create new products (mean – 4.60). However, cooperatives from Świętokrzyskie Voivodeship a little bit higher assessed this feature as there is a mean of 4.7 while in case of cooperatives from Małopolskie Voivodeship a mean is 4.5. For cooperatives from Świętokrzyskie Voivodeship extremely important is also the ability to create new technologies (mean – 4.7), while cooperatives from Małopolskie Voivodeship assess the possession of own B&R units as extremely important (mean – 4.5),
- most of indicated resources/competencies are assessed to be very important. Either of cooperatives from Świętokrzyskie and Małopolskie voivodeships assess as very important: amount of the budget for R&D activities, and cooperation with scientific and/or scientific and research institutions (mean – 4.15), modernity of technical equipment of R&D units, and knowledge of staff employed in R&D activities (mean – 4.00), degree of computerization of R&D works, and the ability to anticipate changes in technique and technology (mean 3.90). It is worth to indicate that cooperatives from Świętokrzyskie Voivodeship higher assessed amount of the budget for R&D activities, cooperation with scientific and/or scientific and research institutions, degree of computerization of R&D works, and the ability to anticipate changes in technique and

technology than cooperatives from Małopolskie Voivodeship. The possession of own B&R units is also assessed as very important by cooperatives from Świętokrzyskie Voivodeship.

Neither of cooperatives from both voivodeships assessed the validity of resources / competencies in the field of R&D as little important or completely unimportant.

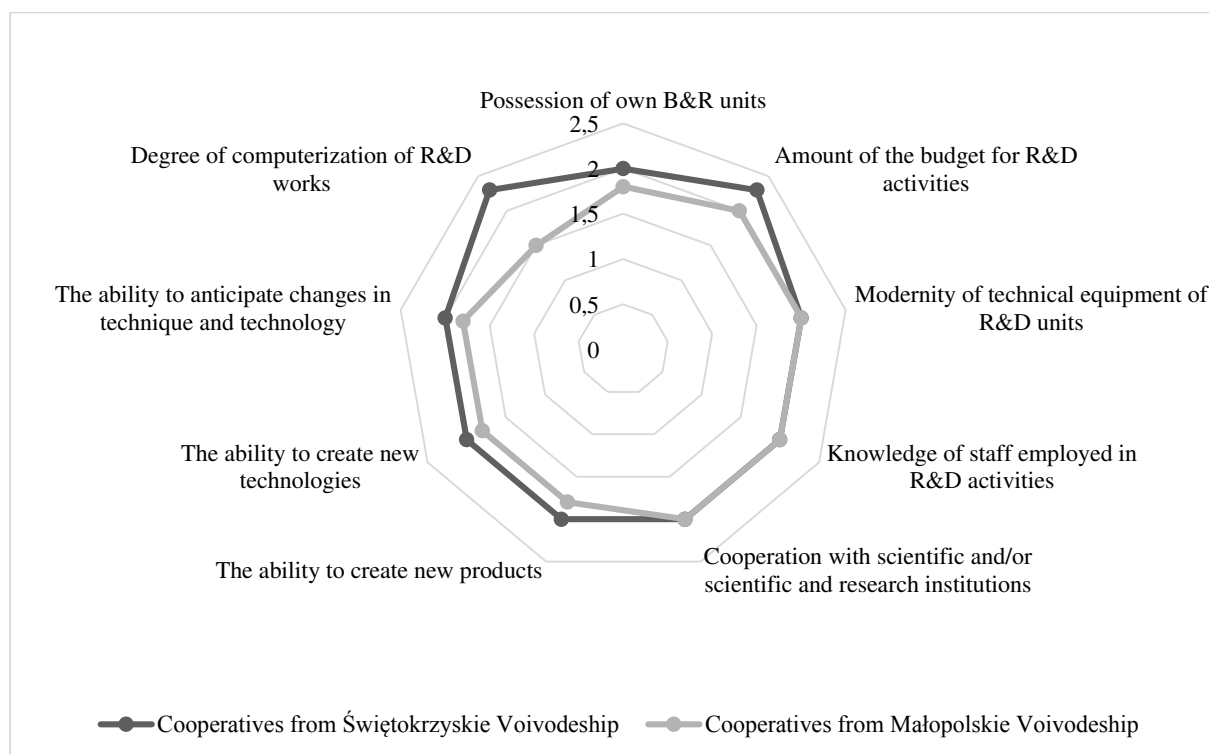
**Table 2.**

*The assessment of the state of resources/competencies of dairy cooperatives in the field of R&D in comparison to competition*

| Resources/competencies of cooperatives in the field of R&D              | Cooperatives from Świętokrzyskie Voivodeship | Cooperatives from Małopolskie Voivodeship | Mean        |
|---|--|---|-------------|
| Possession of own B&R units   | 2.0  | 1.8                                       | <b>1.90</b> |
| Amount of the budget for R&D activities                                 | 2.3  | 2.0                                       | <b>2.15</b> |
| Modernity of technical equipment of R&D units                           | 2.0  | 2.0                                       | <b>2.00</b> |
| Knowledge of staff employed in R&D activities                           | 2.0  | 2.0                                       | <b>2.00</b> |
| Cooperation with scientific and/or scientific and research institutions | 2.0  | 2.0                                       | <b>2.00</b> |
| The ability to create new products                                      | 2.0  | 1.8                                       | <b>1.90</b> |
| The ability to create new technologies                                  | 2.0  | 1.8                                       | <b>1.90</b> |
| The ability to anticipate changes in technique and technology           | 2.0  | 1.8                                       | <b>1.90</b> |
| Degree of computerization of R&D works                                  | 2.3  | 1.5                                       | <b>1.90</b> |
| <b>Mean</b>   | <b>2.07</b>                                  | <b>1.86</b>                               |             |

Rating scale: 3 – better, 2 – similar, 1 – worse state of resources/competences in comparison to competitors.

Source: own work and (Konieczna, 2017).



**Figure 2.** The assessment of the state of resources/competencies of dairy cooperatives in the field of R&D in comparison to competition.

Source: own work.

While taking into account the assessment of the state of resources/competencies of dairy cooperatives in the field of R&D in comparison to competition it is seen that it is rather similar. However, there is a difference in assessing it. For cooperatives from Świętokrzyskie Voivodeship the state of resources/competencies is similar or a little bit better than competitors. On the other hand, the state of resources/competencies is similar or lower than competitors in case of cooperatives from Małopolskie Voivodeship. For cooperatives from Świętokrzyskie Voivodeship the strategic potential in the form of the amount of the budget for R&D activities, and degree of computerization of R&D works is a little bit better than competition. It is worth to indicate that there is a difference in assessing the degree of computerization of R&D works, as cooperatives from Świętokrzyskie Voivodeship claim that is a little bit better than competitors, the cooperatives from Małopolskie Voivodeship assessed it as rather worse than competitors. The cooperatives from Świętokrzyskie Voivodeship found their resources and competencies in research and development to be similar to or better than their competitors. On the other hand, the cooperatives from Małopolskie Voivodeship found some of their resources and competencies to be similar to their competitors, while others were deemed to be worse.

#### **4. Discussion and Conclusion**

R&D enables a company to maintain a competitive edge by addressing emerging market demands and needs. Therefore, companies need to recognize the significance of resources and competencies in the R&D field and understand how they stack up against their competitors.

Quélin (2000, p. 477) reached similar conclusions indicating technological competencies. He stated that there are two difficulties in managing technology competencies. Therefore, it is necessary to first identify and assess competencies both internally and/or in their product or service manifestations. Second, when businesses compete, they need to be more exposed to the outside world because they wish to acquire the complimentary competencies that their competitors possess. As claim Carrick (2016) basing on conducted research the development of R&D resources is the result of a distinct combination of past choices, upcoming prospects, assets, competencies, and practices. Taking into account the analysis of the research results and taking into account the formulated questions and hypotheses it can be seen that cooperatives are aware of the importance and the state of resources and competencies in the field of R&D in comparison with competition. Representatives of the cooperatives evaluated the resources and competencies of their organizations and assigned a value to each of the provided response choices. In this approach, hypothesis H1 was confirmed. Similarly, hypothesis 2 (H2) was also confirmed. Cooperatives from two nearby voivodeships, Świętokrzyskie and Małopolskie, vary in how important they see the mentioned resources and abilities in the sphere of R&D.

Research findings indicate that cooperatives from Świętokrzyskie Voivodeship have slightly higher ratings for the importance of the identified resources and competencies. In this instance, the average is 4.29, which is higher than the cooperatives from Małopolskie Voivodeship, where the average is slightly lower at 4.03. The third hypothesis (H3) was not confirmed because it was argued that dairy cooperatives do not have a stronger strategic potential in research and development compared to their competitors. Based on the research findings, the strategic capabilities closely resemble those in competition. Nevertheless, the evaluation of cooperatives varies depending on the voivodeships they are located in.

The limitation of the research which results were showed here is the quantity of cooperatives and the territorial research area. Suggestions for future research could involve exploring the constraints of this study by conducting research on cooperatives in different regions to determine their understanding of the significance and condition of R&D resources and competencies.

## References

1. Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, Vol. 17, No. 1*, pp. 99-120.
2. Bowman, C., Ambrosini, V. (2003). How the Resource-based and the Dynamic Capability Views of the Firm Inform Corporate-level Strategy. *British Journal of Management, No. 14*, pp. 289-303.
3. Carrick, J. (2016). R&D resources development in life sciences ventures: a dynamic capabilities perspective. *Journal of Small Business and Enterprise Development, Vol. 23, No. 4*, pp. 1191-1207. doi:10.1108/JSBED-04-2016-0054.
4. Cheng, J., Huang, D., Wu, Y. (2023). Managerial perception on competition and strategic R&D decisions, *Economic Modelling, Vol. 123, June*, doi:10.1016/j.econmod.2023.106281.
5. Cohen, W.M., Levinthal, D.A. (1989). Innovation and Learning: The Two Faces of R & D, *The Economic Journal, Vol. 99, Iss. 397, 1 September*, pp. 569-596, doi:10.2307/2233763.
6. Crook, T.R., Ketchen Jr, D.J., Combs, J.G., Todd, S.Y. (2008). Strategic Resources and Performance: A Meta-Analysis. *Strategic Management Journal, No. 29*, pp. 1141-1154.
7. de Jong, M., Marston, N., Roth, E., van Biljon, P. (2013). *The Eight Essentials of innovation performance*. New York City: McKinsey & Company.
8. Gajdzik, B., Wolniak, R. (2022). Framework for R&D&I Activities in the Steel Industry in Popularizing the Idea of Industry 4.0. *Journal of Open Innovation: Technology, Market, and Complexity, Vol. 8, Iss. 3*, pp. 1-33, doi:10.3390/joitmc8030133.

9. Gutterman, A. (2023). *Research and Development*. Retrieved from: [https://www.researchgate.net/publication/374165839\\_Research\\_and\\_Development](https://www.researchgate.net/publication/374165839_Research_and_Development), 12.09.2024.
10. Jasiński, A.H. (2014), Innowacyjność polskiego przemysłu, 2006–2012: Był postęp czy nie? In: A. Kamińska (Ed.), *Innowacyjność. Uwarunkowania, strategie, wyzwania*. Warszawa: Placet.
11. Jissink, T., Schweitzer, F., Rohrbeck, R. (2019). Forward-looking Search during Innovation Projects: Under Which Conditions It Impacts Innovativeness. *Technovation*, Vol. 84-85, June-July, pp. 71-85.
12. Kerssens-van Drongelen, I.C., de Weerd-Nederhof, P.C., Fisscher, O.A.M. (1996). Describing the issues of knowledge management in R&D: Towards a communication and analysis tool. *R&D management*, 26(3), pp. 213-230, doi:10.1111/j.1467-9310.1996.tb00957.x.
13. Konieczna, I. (2017). Innowacyjność spółdzielni w świetle wykorzystywanych zasobów i kompetencji w sferze działalności badawczo-rozwojowej na przykładzie spółdzielni mleczarskich województwa świętokrzyskiego. *Studia i Materiały Miscellanea Oeconomicae*, No. 2, pp. 363-372.
14. Kossowska, M., Sołtysińska, I. (2002). *Szkolenia pracowników a rozwój organizacji*. Kraków: Oficyna Ekonomiczna.
15. Luo, Y. (2004). Building a Strong Foothold in an Emerging Market: A Link Between Resource Commitment and Environment Conditions. *Journal of Management Studies*, Vol. 41, No. 5, pp. 749-773. doi:10.1111/j.1467-6486.2004.00452.x.
16. Martínez-Ros, E., Tribo, J. (2005). Financial sources of R&D investment. *Corporate Ownership and Control*. 3, pp. 191-202, doi:10.22495/cocv3i2c1p4.
17. OECD (2015). *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development*. The Measurement of Scientific, Technological and Innovation Activities. Paris: OECD. DOI: <http://dx.doi.org/10.1787/9789264239012-en>.
18. Perez-Alaniz, M., Lenihan, H., Doran, J., Hewitt-Dundas, N. (2022). Financial resources for research and innovation in small and larger firms: Is it a case of the more you have, the more you do? *Industry and Innovation*, 30(2), pp. 189-232, doi:10.1080/13662716.2022.2036597.
19. Piachaud, B. (2004). The Core Competency Framework and Approaches to R&D. In: *Outsourcing of R&D in the Pharmaceutical Industry*. London: Palgrave Macmillan, Doi:10.1057/9780230512634\_5.
20. Pisano, G.P. (2012). Creating an R&D Strategy. *Harvard Business School Working Paper*, No. 12-094, pp. 1-9.
21. Lichtarski, J. (ed.) 2001. *Podstawy nauki o przedsiębiorstwie*. Warszawa: PWE.

22. Quélin, B. (2000). Core competencies, R&D management and partnerships. *European Management Journal*, Vol. 18, Iss. 5, pp. 476-487, doi:10.1016/S0263-2373(00)00037-2.
23. Sarpong, D., Boakye, D., Ofosu, G., Botchie, D. (2023). The three pointers of research and development (R&D) for growth-boosting sustainable innovation system. *Technovation*, Vol. 122, April, pp. 1-9, doi:10.1016/j.technovation.2022.102581.
24. Sirmon, D.G., Hitt, M.A., Ireland, R.D. (2007). Managing Firm Resources in Dynamic Environments to Create Value: Looking Inside the Black Box. *Academy of Management Review*, No. 1, pp. 273-292.
25. Stankiewicz, M.J. (2002). *Konkurencyjność przedsiębiorstwa. Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*. Toruń: TNOiK Dom Organizatora.
26. Szopik, K. (2007). Działalność badawczo-rozwojowa w Polsce. *Zeszyty Naukowe Uniwersytetu Szczecińskiego*, 8, pp. 285-294.
27. Turek, I. (2015). Współpraca między organizacjami w zarządzaniu pracami badawczo-rozwojowymi. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, no. 225, pp. 213-221.
28. Walas-Trębacz, J. (2010). System zarządzania sferą B+R w przedsiębiorstwie. In: A. Stabryła (Ed.), *Analiza i projektowanie systemów zarządzania przedsiębiorstwem*. Kraków: Mfiles.pl, pp. 101-137. Retrieved from: [https://www.researchgate.net/publication/350386785\\_Analiza\\_i\\_projektowanie\\_systemow\\_zarządzania\\_przedsiębiorstwem](https://www.researchgate.net/publication/350386785_Analiza_i_projektowanie_systemow_zarządzania_przedsiębiorstwem), 12.09.2024.
29. Wernerfelt, B. (1984). A Resource-based View of the Firm. *Strategic Management Journal*, No. 5, pp. 171-180.
30. Wu, W.-W. (2009). Exploring core competencies for R&D technical professionals. *Expert Systems with Applications*, Vol. 36, Iss. 5, pp. 9574-9579, doi:10.1016/j.eswa.2008.07.052.



## CHANGES IN CONSUMER BEHAVIOR AND PREFERENCES AMID DIGITAL TRANSFORMATION: PRESENTATION AND COMPARISON OF RESEARCH RESULTS 2022-2024

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**Purpose:** This objective of this paper is to present the results of the consumer preference research and confront them with the results of similar research conducted in 2022.

**Design/methodology/approach:** A literature review and analysis of available research were conducted. Additionally, the author organized and executed a consumer preference study using online survey tools.

**Findings:** The 2024 survey results confirm that an increasing number of interactions with brands and services are now conducted through digital channels.

**Research limitations/implications:** The latest survey was conducted with a larger group of respondents from various countries. However, the majority of participants were young people with higher education, which may result in the findings not being fully representative of the entire population.

**Practical implications:** Technological change is essential to most industries and services. As consumer behavior shifts, there is a clear trend toward increased use of digital communication channels. Entrepreneurs must stay attuned to these changes and their pace to adapt effectively and seize the opportunities they present for business growth. This article analyzes the changes observed in recent years and offers practical recommendations.

**Social implications:** The essence of this work is to understand the societal changes brought about by digital transformation. It highlights the importance of the human factor in the communication between consumers and service providers.

**Originality/value:** This article examines contemporary consumer behavior within the context of ongoing digitalization. It presents a comparative analysis of current research findings against those of a previous iteration. This analysis, utilizing a unique dataset, provides insights into shifting consumer patterns driven by technological advancements. The article concludes by identifying potential areas for further research to expand upon these findings.

**Keywords:** customer experience, digitalization, consumer preferences, digital transformation.

**Category of the paper:** Research paper.

## 1. Introduction

In *Value proposition design: How to create products and services customers want* (Osterwalder et al., 2015), the authors stress the importance of understanding of customers preferences. The events of the past five years—marked by global pandemics, new armed conflicts, emerging technologies, and social changes—are increasingly leading us to realize that the world is changing faster and in more unpredictable ways than ever before. Understanding the dynamics of these changes is crucial, and further investigation into their trajectory is warranted to deepen this understanding.

The author conducted a consumer survey in 2022 and published results in a paper titled “High-tech vs High Touch-Challenges in Managing the Consumer Experience with Brands in the Digital Age” (Kordecki, 2022). The aim of the study was to identify trends and phenomena influencing consumer behavior, with a particular focus on understanding how technological advancements shape these behaviors. The findings of the research affirmed that consumers expect brands to maintain a balanced approach by integrating both technical and human factors.

In the first study, the author focused on how people’s interactions with brands, companies, and services are changing. Experiences that were once personal are increasingly becoming digital, with some now being exclusively digital. This ongoing shift toward digitization remains significant, as it carries important implications for our lives, both in the short and long term. Much attention is being given to the economy (Haefner, Sternberg, 2020), sustainable development (Ionescu-Feleagă et al., 2023), technology adoption (Brodny, Tutak, 2022), societal impact (Loebbecke, Picot, 2015; Grybauskas et al., 2020) and many other aspects of life. In this paper, the aim is to examine the touchpoints and moments when individuals interact with brands and services, either through digital channels or personal interactions. This shift represents one of the most prominent effects of digitalization in our daily lives.

The evolving consumer behavior, primarily driven by rapid digitalization, necessitates continuous monitoring of consumer preferences. The author decided to repeat the study in a similar form and scope. As such, the research results offer a contemporary viewpoint and juxtapose the present situation with the past. Furthermore, the author broadened the research scope by incorporating respondents from outside Poland to investigate whether nationality and place of residence might influence consumer behavior and preferences regarding the specific use of digital tools in their daily routines.

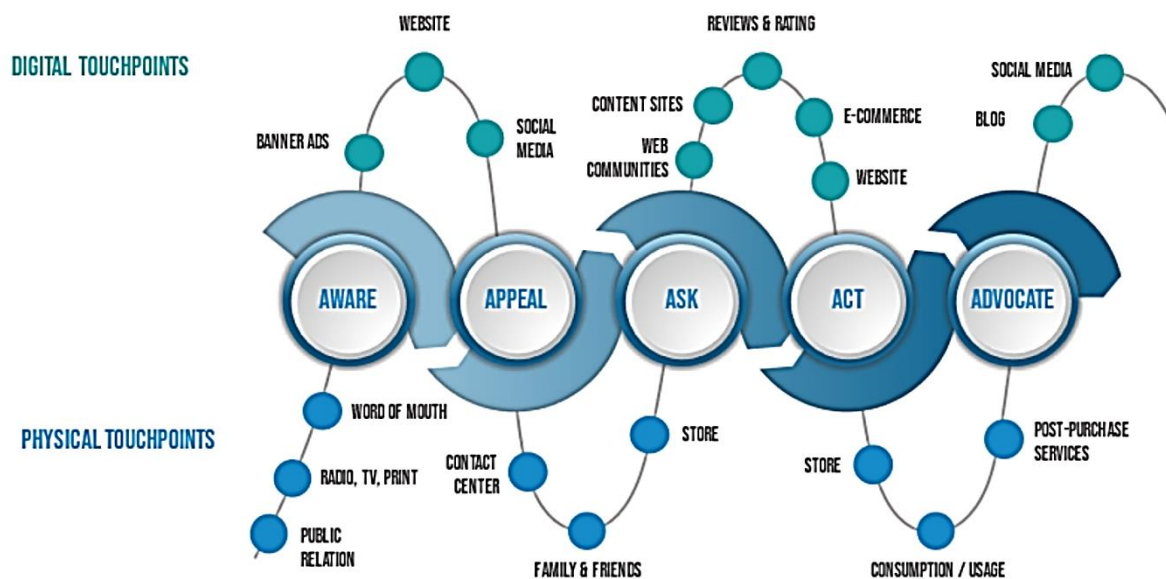
This article presents the latest study results and compares them with those from the previous edition. The research gap in this area remains significant due to the dynamic nature of ongoing digitalization, which is drastically altering service delivery methods. The findings are also valuable to business practitioners as they reveal consumer preferences and can indicate the future direction of these trends.

## 2. Theoretical background

Consumer behavior, particularly in the digital age, has become a focal point for both researchers and business practitioners. A recent bibliometric analysis and systematic literature review conducted by Monoarfa et al. (2024) examined online grocery shopping trends, revealing a surge in research interest from 2015 to 2022. This study highlighted customer experience as a key area of focus within this growing body of research.

The impact of demographics on digital adoption and consumer behavior is further underscored by Conlin and Labban's (2019) study. Their survey of 14,807 US grocery shoppers found that younger demographics tend to be more engaged in online grocery shopping, highlighting the influence of age on digital preferences.

This emphasis on customer experience aligns with the observations of marketing expert Phillip Kotler (2024). Kotler argues that the digital revolution has fostered a new breed of informed and discerning consumers. This shift is largely attributed to the internet's accessibility, empowering consumers to research products, compare prices, read reviews, and engage in online communities to share experiences and opinions (Kotler, 2024).



**Figure 1.** Physical and digital touchpoints along the 5A customer path.

Source: Kotler et al., 2021.

The evolution of marketing and digitalization has significantly altered the way consumers engage with brands and products. The consumer progresses through five stages, known as the five "A"s (Aware, Appeal, Ask, Act, and Advocate), during which they are continuously engaged with the brand. Companies have access to a variety of marketing and technical resources to engage with customers at each of these stages. Furthermore, with the aid of increasingly sophisticated IT tools, communication is becoming more coordinated across all channels throughout the consumer's entire shopping journey (Kotler et al., 2021).

What is an interesting aspect for research on the human – technology touchpoint is the Technology Acceptance Model (TAM) developed by Davis. It has been widely used as it is a well-established and proven framework for studying consumer's acceptance of new technologies. The core of this model states that Perceived Usefulness and Perceived Ease of Use, help overcome consumer resistance to the technology acceptance and adoption (Davis, 1989). The first term refers to the degree of perceived value brought by using the technology, while the second refers to the degree of ease of using it.

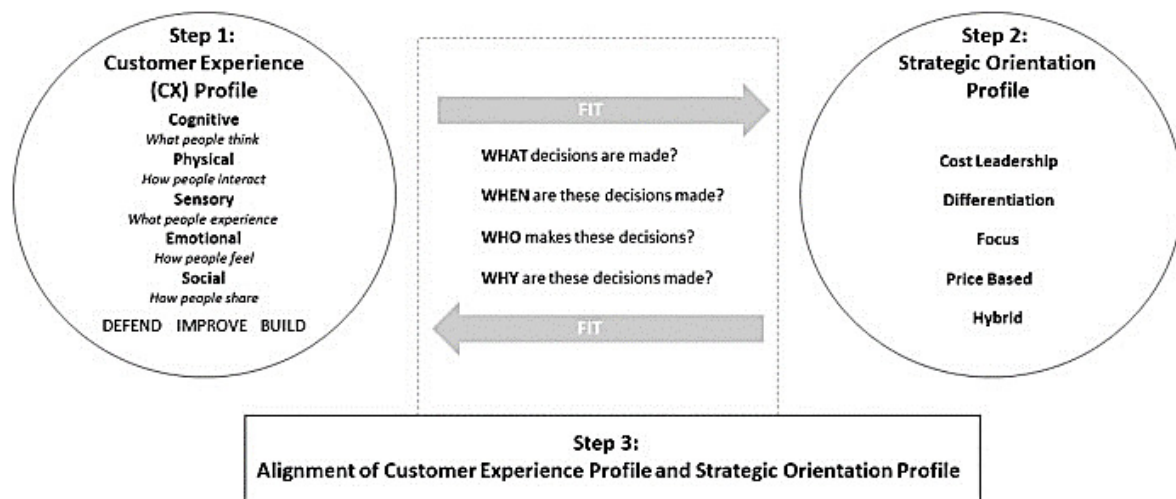
Customer experience (CX), encompassing cognitive, emotional, physical, sensorial, and social responses elicited by market actors (De Keyser et al., 2015), has become paramount in product development. This is particularly evident in the realm of IT and software, where rigorous testing is essential.

Testing occurs on at least two levels. First, technical functionality is assessed to ensure the application is error-free, stable, and achieves its intended purpose (Perceived Usefulness). Second, the user interface undergoes scrutiny to guarantee ease of use and effective interaction for the intended user (Perceived Ease of Use, Davis).

This emphasis on user-friendliness is where User Experience (UX) and Customer Experience (CX) converge. Borrowed from the design world, these concepts prioritize creating products and services that are intuitive and enjoyable to use. Recognizing the significant business value of positive user experiences (Ross, 2014), companies across all sectors are investing heavily in UX and CX optimization.

However, the companies should closely monitor the results of the customer focused strategy. It is important to apply a right framework and measure results (Sward, Macarthur, 2007). Research also confirms that companies need to be consistent in their efforts to understand customer behavior, and it's important for them to conduct regular customer research in the right manner (Güler-Bıyıklı, 2024).

The concept of the business model, and Business Model Innovation in particular, has been widely discussed. What is broadly acknowledged is the role of Customer Experience in innovating products and services, and therefore contributing to Business Model Innovation. Both terms are topics of high interest and importance to both managers and researchers. However, recently, more research has been conducted to investigate the impact of a customer-centric approach on an actual business model and how companies can move from products to integrated customer experiences through Business Model Innovation (Keiningham et al., 2020). The authors introduced the Customer Experience Driven Business Model Innovation (CX-BMI), a framework designed to conceptualize the relationship between both disciplines (see Figure 2). The three-step approach emphasizes understanding the Customer Profile, comprehending the strategic internal situation of the organization, and aligning both Customer Experience and Strategic Orientation profiles.



**Figure 2.** Customer Experience Driven Business Model Innovation (CX-BMI).

Source: Kotler et al., 2021.

Customer Experience is undoubtedly one of the disciplines that can be a source of competitive advantage because it brings real value that is appreciated by the customer. Delivering the value customers want is now easier thanks to the customer data that companies can collect. IT tools enable not only their collection but, above all, their processing. However, the challenge for companies remains how to effectively manage this information so that it can be a valuable factor supporting the activities of user experience (CX) design teams (Holmlund et al., 2020). These learnings can be confirmed by another research. The lack of personalized assistance decreases the customer experience and resellers try to substitute it with online shopping assistants (OSAs) (Singh et al., 2024).

In today's digital age, analyzing data from a single source, such as statistical data illustrating customer behavior on websites, is no longer a challenge. However, the real complexity lies in integrating this data with other sources, including brick-and-mortar sales points. The emergence of OmniChannel, particularly in retail but also in overall brand engagement across multiple channels, is a trend that profoundly influences consumer behavior (Verhoef et al., 2015).

Retail companies face a strategic decision in managing sales across multiple channels, often in competition with each other for customer attention, which can significantly impact final sales figures (Pauwels, Neslin, 2015). Therefore, a comprehensive understanding of customer behavior and preferences is crucial. By breaking down silos and prioritizing harmonization and omnichannel approaches, this task becomes more manageable.

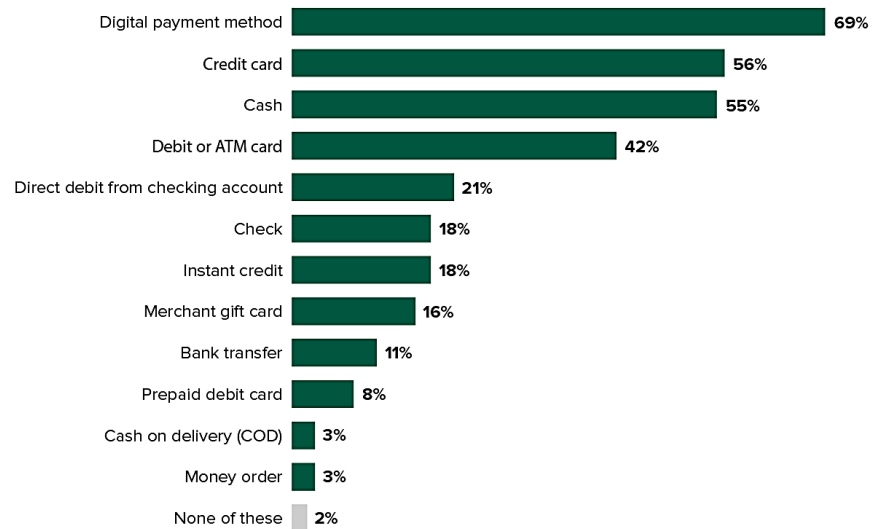
Artificial intelligence (AI) presents another significant, and rapidly growing, influence on customer experience. While automated chatbots offer a readily apparent example, they represent merely the leading edge of AI's transformative potential in this domain.

Although research on AI's impact on CX remains in its early stages, existing studies, such as Ameen et al. (2021), suggest that consumer attitudes toward AI mirror those associated with technology adoption more broadly. While consumers are drawn to the convenience and value

promised by AI tools, trust in the technology and a perceived ability to fulfill their needs are crucial factors driving adoption.

Further amplifying the technological transformation of customer experience is the rise of digital payments. As highlighted by Varon and Murgia (2024), digital payment methods have become dominant in leading global economies, including the United States, underscoring the profound shift in how consumers transact and engage in commerce.

**“Which of the following payment methods did you use in the past three months to make a purchase?”**  
(Multiple responses accepted)



**Figure 3.** Digital Payments Are the Most Commonly Used Payment Method In The US Today.

Source: Varon, Murgia, 2024.

Digitalization impacts virtually every aspect of life, including how consumers interact with brands, products, and services. This phenomenon interests researchers across various fields. The examples above illustrate areas that overlap with the scope of the presented consumer research.

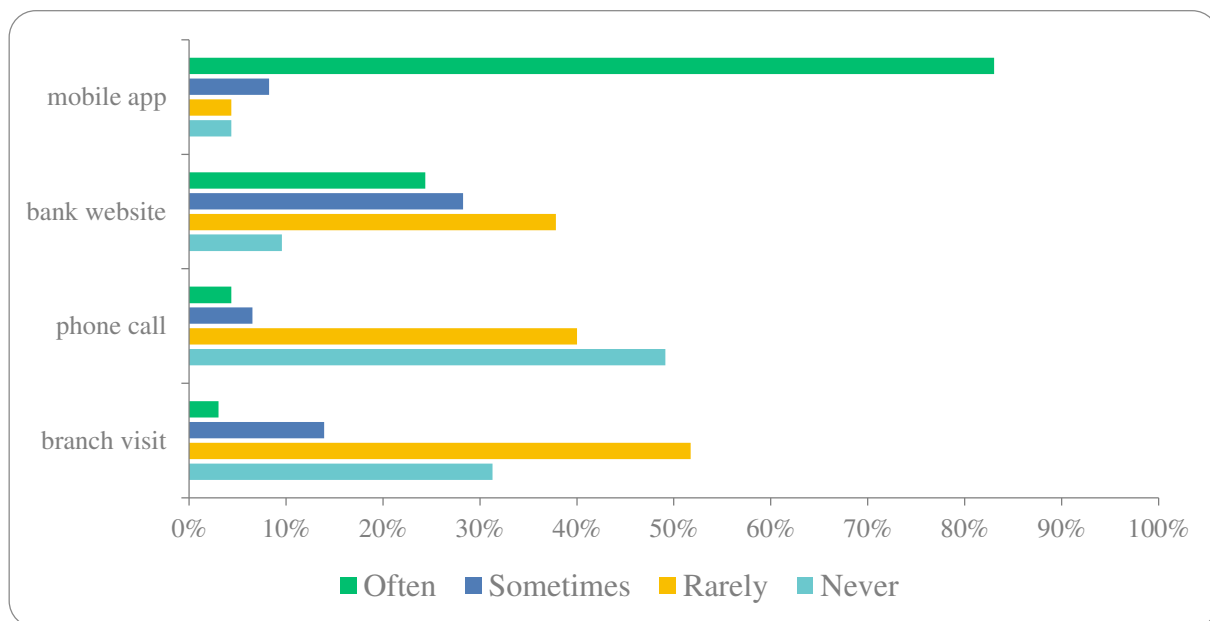
### 3. Research and findings

The survey, titled "Changing Consumer Choices and Preferences in the Context of Digital Transformation," was conducted in March and April 2024. This year's edition had 230 participants, compared to 106 in the fall of 2022. Previous surveys were available only to native speakers, but the current survey was offered in English and Spanish as well. The vast majority of respondents chose to complete the survey in Polish or English, with only 14 opting for the Spanish version. The survey was available online, and participants were recruited via email and social media. The survey group was randomly selected and is not representative of

the overall social structure. Respondents were asked about specific activities and to indicate the extent to which they performed each activity using digital communication channels. Results from the research are presented below.

**Q1: How do you use banking services?**

The first question in the survey asked respondents how they use banking services. This sector has been undergoing significant transformation for several years, as reflected in the survey results. The most frequent method of accessing banking services is through a mobile app, with 83% of respondents using this option, followed by online banking via a browser. Visits to bank branches and phone calls have become less common. Notably, consumer behavior has not changed significantly since the fall 2022 survey.



**Figure 4.** How do you use banking services.

Source: Own research.

**Table 1.**

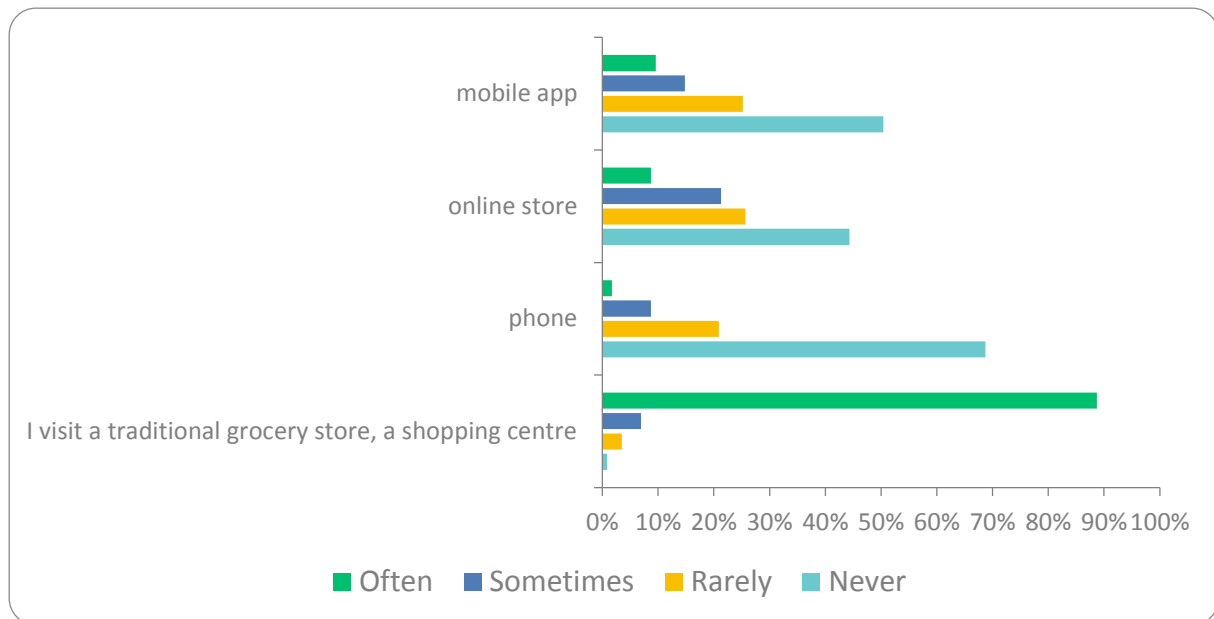
*How do you use banking services 2022-2024*

|              | <b>Often</b>        | <b>Sometimes</b> | <b>Rarely</b>       | <b>Never</b>        |
|--------------|---------------------|------------------|---------------------|---------------------|
| Mobile app   | <b>90,57-83,04%</b> | 4,72-8,26%       | 0,94-4,35%          | 4,72-4,35%          |
| Bank website | 30,19-24,35%        | 31,13-28,26%     | <b>32,07-37,83%</b> | 6,60-9,57%          |
| Phone call   | 6,60-4,35%          | 0,94-6,52%       | 44,34-40,00%        | <b>48,11-49,13%</b> |
| Branch visit | 0,94-3,04%          | 8,49-13,91%      | <b>56,60-51,74%</b> | 33,96-31,30%        |

Source: Own research.

**Q2: How do you shop for food?**

The second question aimed to understand food purchasing habits. Nearly 90% of respondents reported shopping traditionally by visiting physical stores and food markets. Compared to the 2022 results, there is a slight shift towards digital channels. Although traditional shopping remains dominant, people are increasingly opting for online grocery shopping.



**Figure 5.** How do you shop for food.

Source: Own research.

**Table 2.**

*How do you buy food 2022-2024*

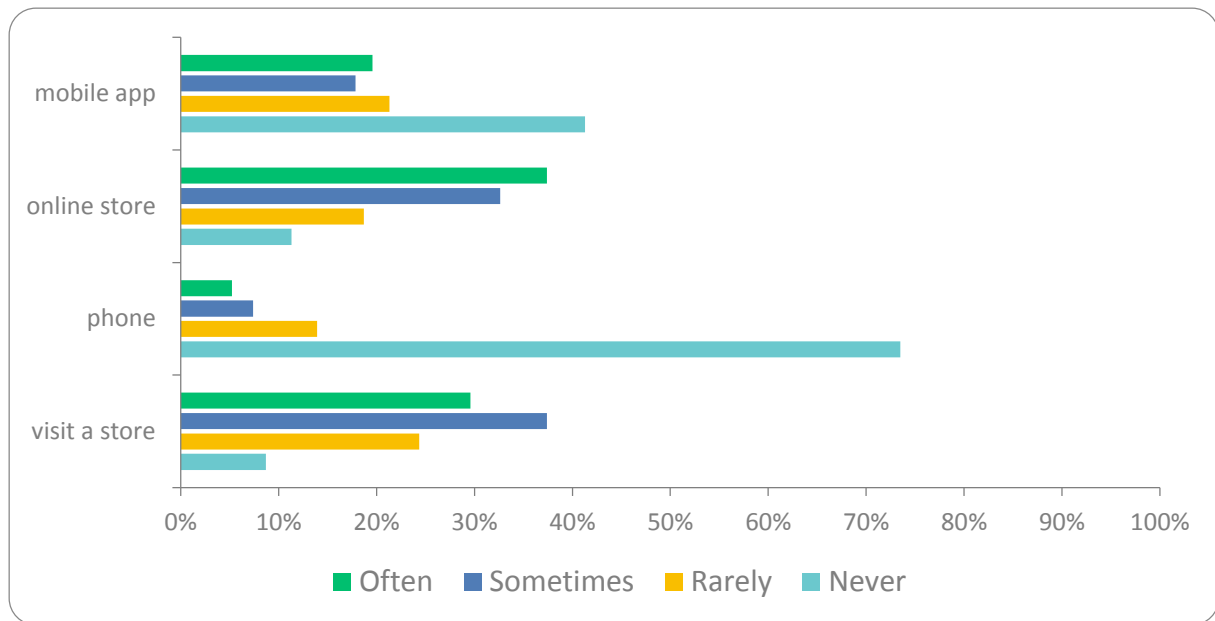
|                                | Often        | Sometimes    | Rarely       | Never        |
|--------------------------------|--------------|--------------|--------------|--------------|
| Mobile app                     | 3,77-9,57%   | 10,38-14,78% | 35,85-25,22% | 50,00-50,43% |
| Online store                   | 3,77-8,70%   | 14,15-21,30% | 45,28-25,65% | 36,79-44,35% |
| Phone call                     | 0,00-1,74%   | 2,83-8,70%   | 25,47-20,87% | 71,70-68,70% |
| Grocery store, shopping center | 96,23-88,70% | 4,72-6,96%   | 0,00-3,48%   | 0,00-0,87%   |

Source: Own research.

### Q3: How do you buy books?

Buying books was one of the first online shopping experiences. Even though most commodities can now be purchased via browser or mobile phone, visiting traditional bookstores is still very popular. According to our research, nearly 30% of respondents often visit physical bookstores, whereas over 37% frequently buy books online. A phone call remains the least frequent channel for readers to purchase books. Once again, there are no significant changes in consumer behavior compared to the results of the 2022 research.





**Figure 6.** How do you buy books.

Source: Own research.

**Table 3.**

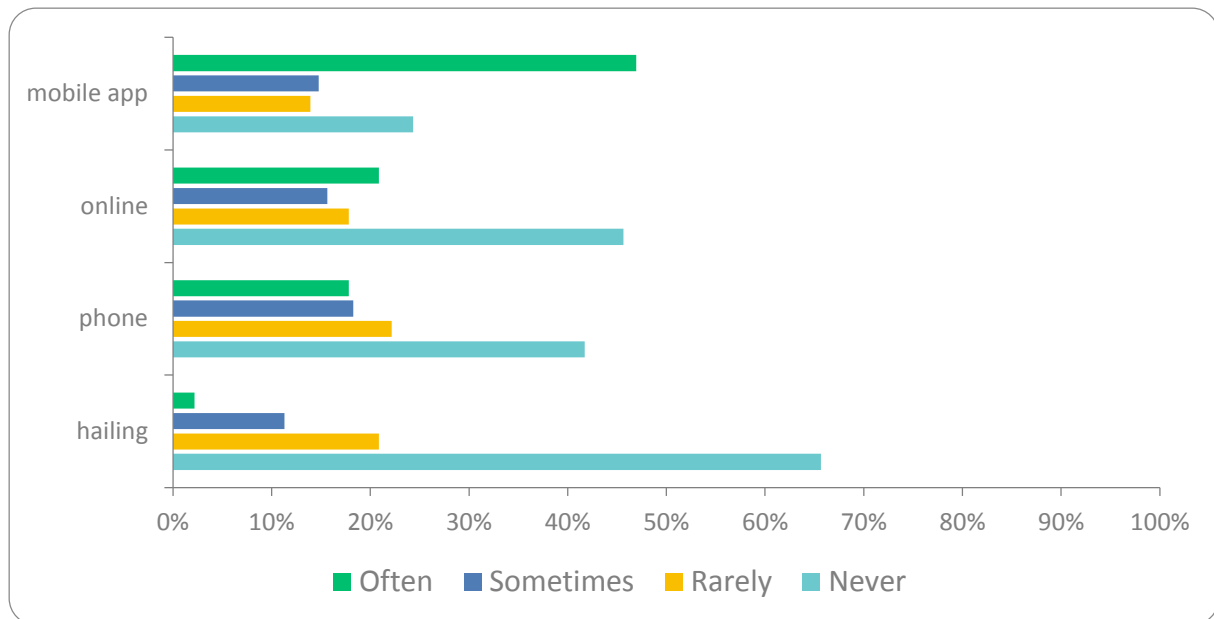
*How do you buy books 2022-2024*

|               | Often        | Sometimes    | Rarely       | Never        |
|---------------|--------------|--------------|--------------|--------------|
| Mobile app    | 14,15-19,57% | 19,81-17,83% | 27,36-21,30% | 38,68-41,30% |
| Online store  | 49,06-37,39% | 30,19-32,61% | 13,21-18,70% | 8,49-11,30%  |
| Phone call    | 0,94-5,22%   | 0,00-7,39%   | 20,75-13,91% | 78,30-73,48% |
| Visit a store | 26,41-29,57% | 34,91-37,39% | 28,31-24,35% | 10,38-8,70%  |

Source: Own research.

**Q4: How do you order transport services?**

The way we travel has been changing recently, especially in urban areas. Commuters now have access not only to public transport but also to car sharing, public bicycle schemes, mopeds, and other means of transport. These options are growing not only in large metropolises but are increasingly available in smaller urban areas as well. Many of these alternative means of transport are available only online, specifically via mobile apps, which makes sense as they are designed for people on the move. Mobile apps are the most popular, with nearly 47% of respondents saying they use them often—an increase from 31% in 2022. This example highlights how the boundaries between browser, desktop, and mobile experiences are becoming increasingly blurred – respondents often confuse online booking with mobile booking.



**Figure 7.** How do you order transport services.

Source: Own research.

**Table 4.**

*How do you order transport services 2022-2024*

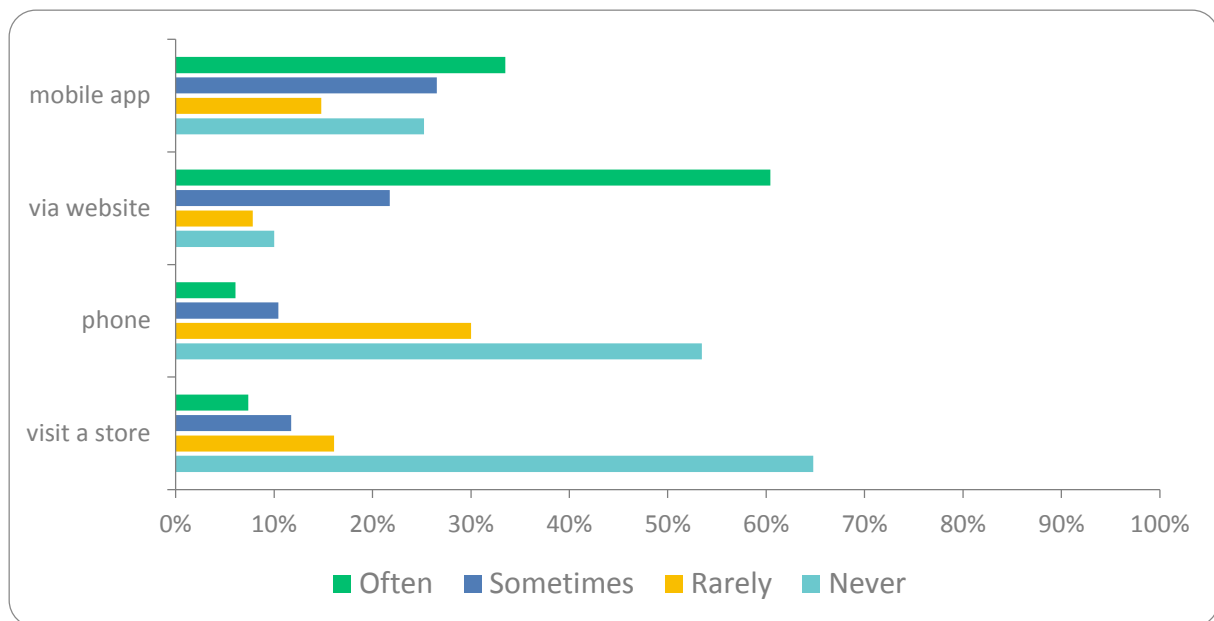
|              | Often        | Sometimes    | Rarely       | Never        |
|--------------|--------------|--------------|--------------|--------------|
| Mobile app   | 31,07-46,96% | 14,15-14,78% | 22,64-13,91% | 31,13-24,35% |
| Online store | 1,89-20,87%  | 0,94-15,65%  | 18,87-17,83% | 81,13-45,65% |
| Phone call   | 29,24-17,83% | 17,92-18,26% | 26,41-22,17% | 27,36-41,74% |
| Hailing      | 4,72-2,17%   | 10,38-11,30% | 33,02-20,87% | 51,89-65,65% |

Source: Own research.

#### **Q5: How do you buy/book travel products? (holidays, flights, hotels etc)**

Low-cost airlines needed an easy, effective, and cost-efficient sales channel to reach millions of new customers for whom traveling became accessible. Other means of transport followed as people's habits changed. For the travel industry, the online experience has become one of the most natural places for searching for and purchasing products. You get inspired by what you see on social media and read in online articles, you can easily browse through accommodations available around the world, check opinions, see locations on the map, and finally make a purchase.

Now, nearly 65% of people would never go to a physical store to buy holidays or book a flight (up from 49% in 2022), and those who rarely do so have dropped to 16% from 27% in 2022. In 2024, 95% of people prefer digital channels (often + sometimes), compared to 73% in 2022.



**Figure 8.** How do you buy/book travel products? (holidays, flights, hotels etc).

Source: Own research.

**Table 5.**

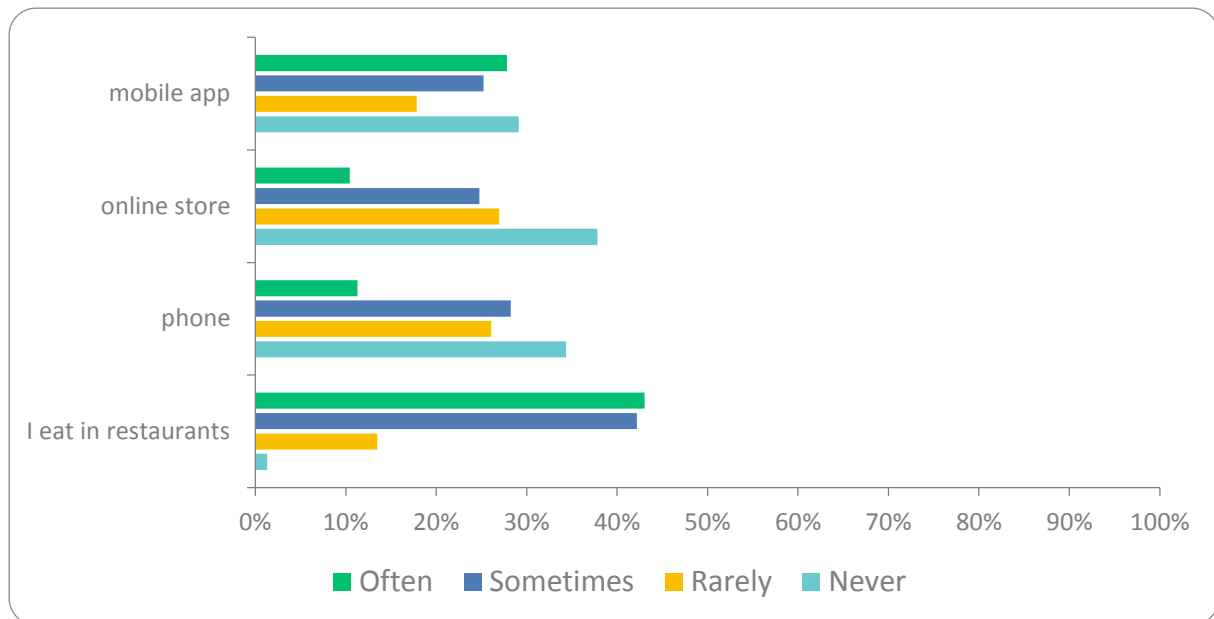
*How do you buy travel products 2022-2024*

|               | Often        | Sometimes    | Rarely       | Never        |
|---------------|--------------|--------------|--------------|--------------|
| Mobile app    | 28,30-34,45% | 17,92-26,52% | 18,87-14,78% | 34,90-25,22% |
| Online store  | 45,45-60,43% | 27,36-21,74% | 16,98-7,83%  | 14,15-10,00% |
| Phone call    | 7,55-6,09%   | 8,49-10,43%  | 22,64-30,00% | 61,32-53,48% |
| Visit a store | 12,26-7,39%  | 12,26-11,74% | 27,36-16,09% | 49,06-64,78% |

Source: Own research.

### Q6: How do you order food 2022-2024

Question number two aimed to understand grocery shopping habits, while question number six focused on eating habits, specifically ordering ready-to-eat food, including dining out. Similar to transport services, recent years have shown a shift from phone orders to mobile app and browser orders. This method is more convenient as consumers can easily browse and choose the meal they want without waiting for their call to be answered. Additionally, easy online payment is another factor that has made this experience very convenient for both sides of the transaction. Despite this shift, we still love to go out and eat in restaurants, as it provides a different experience and satisfies our social needs.



**Figure 9.** How do you order food 2022-2024.

Source: Own research.

**Table 6.**

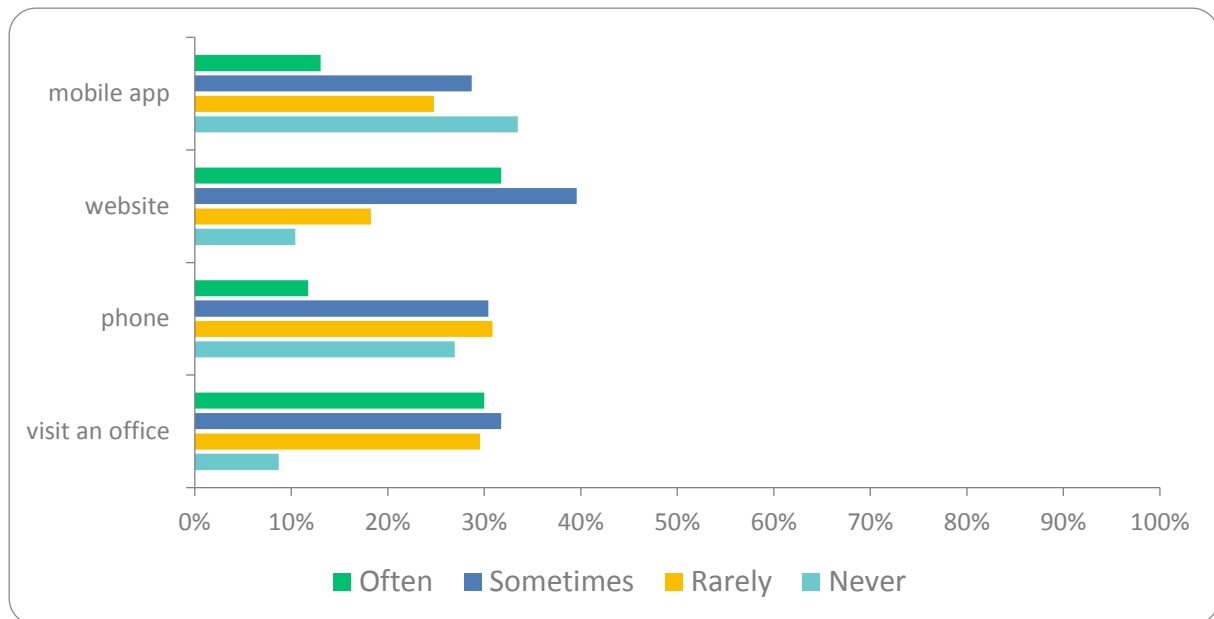
*How do you order food 2022-2024*

|                    | Often        | Sometimes    | Rarely       | Never        |
|--------------------|--------------|--------------|--------------|--------------|
| Mobile app         | 34,91-27,83% | 22,64-25,22% | 15,09-17,83% | 27,36-29,13% |
| Online store       | 16,98-10,43% | 21,70-24,78% | 25,47-26,96% | 35,85-37,83% |
| Phone call         | 27,36-11,30% | 33,96-28,26% | 27,36-26,09% | 12,26-34,35% |
| Visit a restaurant | 34,91-43,04% | 45,28-42,17% | 16,04-13,48% | 3,77-1,30%   |

Source: Own research.

### Q7: How do you deal with administrative affairs?

In 2022, 48.60% of respondents said they most often handled official matters by visiting the office in person. By 2024, this had decreased to 30%, with the most common channel of contact becoming online at 31.74%. Similar to other questions, the growing popularity of the mobile channel is evident here as well. While it may not be the primary choice for contact, fewer respondents answered "never" when asked if they used mobile consultations for official matters.



**Figure 10.** How do you deal with administrative affairs?

Source: Own research.

**Table 7.**

*How do you deal with administrative affairs 2022-2024*

|                 | Often        | Sometimes    | Rarely       | Never        |
|-----------------|--------------|--------------|--------------|--------------|
| Mobile app      | 11,21-13,04% | 14,95-28,70% | 22,43-24,78% | 51,40-33,48% |
| Online store    | 24,30-31,74% | 30,84-39,57% | 27,10-18,26% | 17,76-10,43% |
| Phone call      | 10,28-11,74% | 24,30-30,43% | 38,32-30,87% | 26,17-26,96% |
| Visit an office | 48,60-30,00% | 25,23-31,74% | 25,23-29,57% | 0,94-8,70%   |

Source: Own research.

### Q8: How do consult your health matters?

The last question focused on how we contact doctors to consult about health issues. As in many other areas of life, the COVID-19 pandemic has changed our behavior. What previously seemed impossible or even irrational has now become completely natural or at least acceptable. Research conducted in 2022, although post-pandemic, shows that we haven't abandoned digital channels for health consultations. We've realized that many matters can be handled remotely, and this mode of communication remains important. In 2022, 15% of respondents indicated they occasionally used a mobile app for consultations, while by 2024, nearly 29% did so. While the nature of health problems makes it impossible to completely eliminate personal contact with healthcare providers, many issues can be resolved without direct contact.

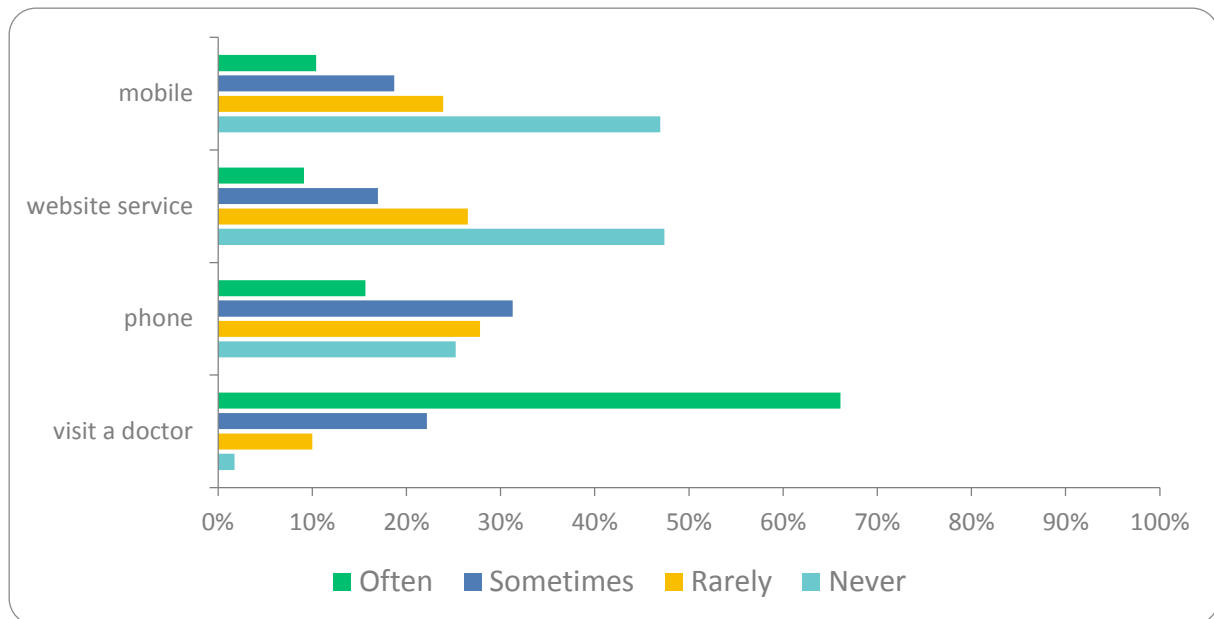


Figure 11. How do consult your health matters?

Source: Own research.

**Table 8.**

*How do consult your health matters 2022-2024*

|                | Often        | Sometimes    | Rarely       | Never        |
|----------------|--------------|--------------|--------------|--------------|
| Mobile app     | 0,00-10,43%  | 6,67-18,70%  | 29,52-23,91% | 55,24-46,96% |
| Online         | 7,62-9,13%   | 7,62-16,96%  | 27,62-26,52% | 57,14-47,39% |
| Phone call     | 20,75-15,65% | 27,36-31,30% | 37,73-27,83% | 14,15-25,22% |
| Visit a doctor | 65,42-66,09% | 23,23-22,17% | 6,54-10,00%  | 2,80-1,74%   |

Source: Own research.

## 4. Discussion

The results of this year's survey should be interpreted as maintaining the trend of the growing role of digital channels in communication between consumers and brands, products, and services. Compared to the results of a similar survey conducted in 2022, there has not been a radical change in the dynamics of digitization in the areas studied. In some areas, a slight decline in the use of digital tools in favor of more traditional channels can even be observed. One reason for this is certainly the different research sample - the number of respondents has over doubled, and respondents this time came from outside Poland (95% reside in European countries). However, the profile of the surveyed population remained very similar - mainly young and middle-aged people with higher education, students or working living in cities (Figure 12 & 13).

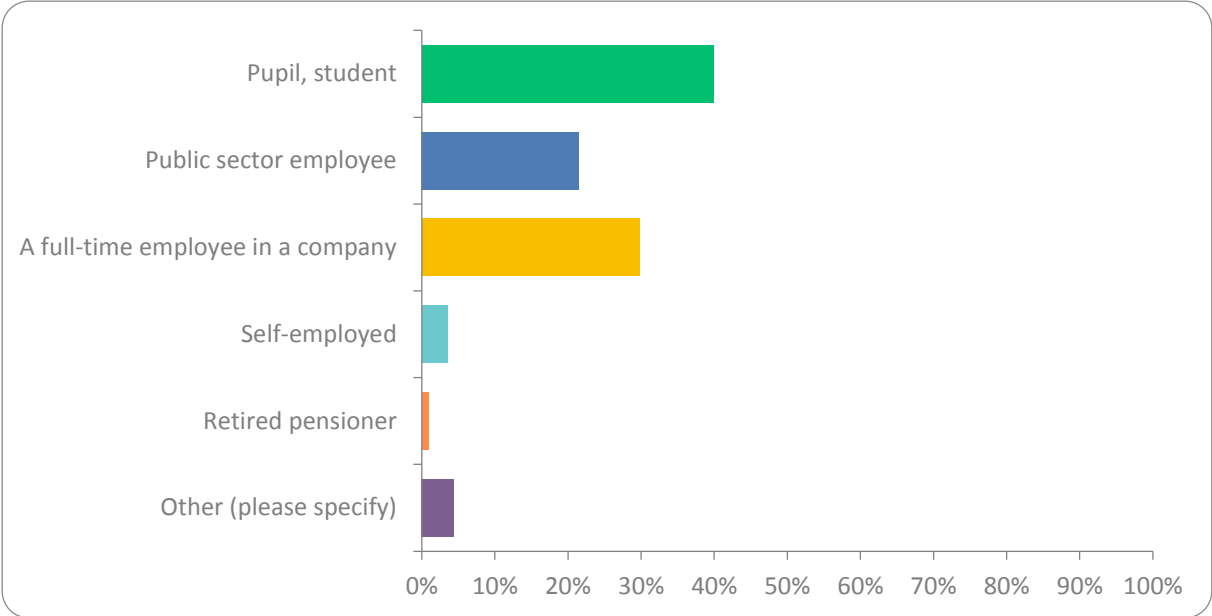


Figure 12. What is your professional situation.

Source: Own research.

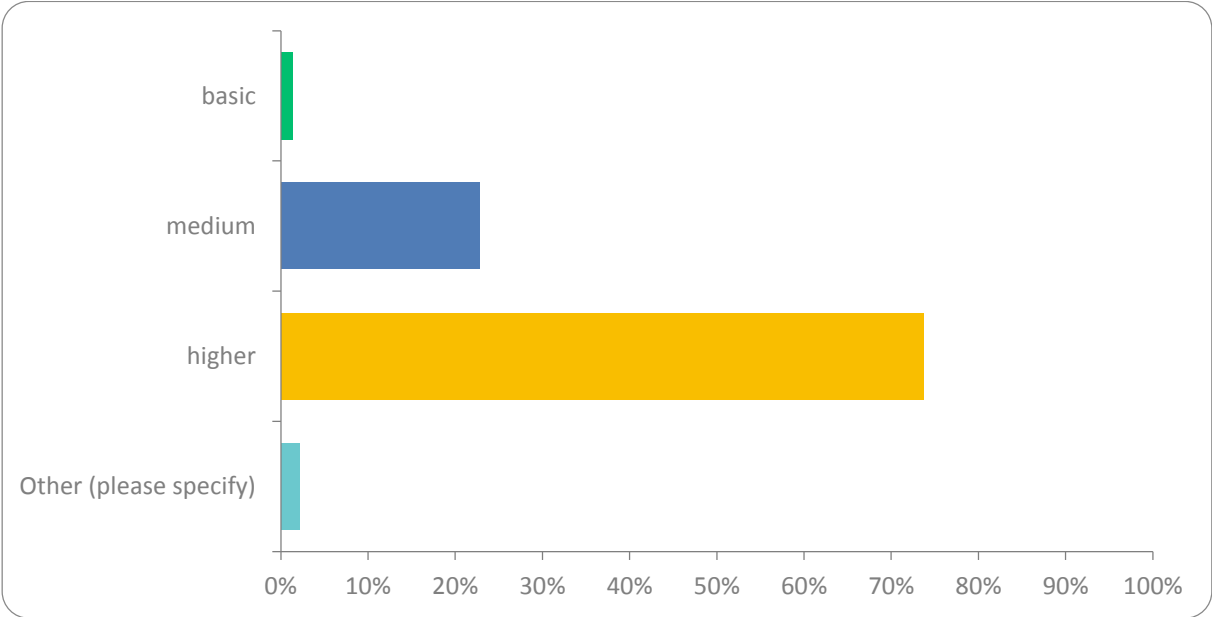


Figure 13. What is your level of education.

Source: Own research.

The questions covered the same areas in both editions and referred to typical and frequent situations, problems, and tasks faced by modern consumers. Therefore, the results of both editions' surveys can be considered comparable and illustrative of consumer attitudes in the described social group. While it is difficult to relate them to the entire population, they undoubtedly provide interesting insights for further discussion of changes taking place in society in the face of digital transformation.

Based on the comments from survey participants and an analysis of their responses, it is evident that the line between online and mobile experiences is increasingly blurred. The distinction between activities done on a computer browser and those on a phone is becoming less significant. In reality, we are constantly online, and the device we use is secondary.

Naturally, we choose devices based on convenience for specific tasks. For example, we are unlikely to use a computer to order transportation services, as it is much more convenient to use a mobile app. Conversely, for work-related tasks, a desktop computer or laptop is generally more suitable. Interestingly, even this distinction is becoming less relevant from the user's perspective.

This blurring of device boundaries is encouraged by service and product providers. The concept of an omnichannel experience allows users to seamlessly continue their online journey across different devices. Being logged in across devices ensures process continuity, enhancing convenience for users and efficiency for sellers. This continuity is a crucial aspect of user experience design and personalization. While consumers largely expect personalization, this expectation varies at different stages of interaction with a service or product. Providing the expected service requires not only the use of digital tools but also their proper integration and configuration. Developing the right software is a crucial segment of the IT industry, equipping companies with the tools to offer end customers a seamless and positive experience that combines the digital and analog worlds—or at least an acceptable experience within digital channels alone (Liu, Walsh, 2023).

Therefore, it is essential to view the survey results from this perspective. When we create only two separate experiences — online and mobile — we overlook the interconnected reality of modern digital usage. Take question number 1: How do you use banking services. The table below shows the combined results.

**Table 9.**

*How do you use banking services 2024*

|                          | <b>Often</b>  | <b>Sometimes</b> | <b>Rarely</b> | <b>Never</b>  |
|--------------------------|---------------|------------------|---------------|---------------|
| Mobile + Online          | 191+56        | 19+65            | 10+87         | 10+22         |
| <b>Total</b>             | 247           | 84               | 97            | 32            |
|                          | <b>53,70%</b> | <b>18,26%</b>    | <b>21,09%</b> | <b>6,96%</b>  |
| Phone + Personal contact | 10+7          | 15+32            | 92+119        | 113+72        |
| <b>Total</b>             | 17            | 47               | 211           | 185           |
|                          | <b>3,70%</b>  | <b>10,22%</b>    | <b>45,87%</b> | <b>40,22%</b> |

Source: Own research.

We can clearly see that digital contact is the first choice, with 53.7% of respondents using digital experiences often. This preference becomes even more prominent when we combine the "Often" and "Sometimes" responses versus the "Rarely" and "Never" options. A total of 71.96% of respondents indicated that they either often or sometimes use digital channels for banking services, while only 28% said they either rarely or never use digital contact. The next table presents a comparable summary for 2022 and 2024 (Table 10).



**Table 10.***How do you use banking services 2022-2024*

|                               | <b>Often</b>  | <b>Sometimes</b> | <b>Rarely</b> | <b>Never</b>  |
|-------------------------------|---------------|------------------|---------------|---------------|
| Mobile + Online 2022          | 60,09%        | 17,84%           | 16,43%        | 5,63%         |
| Mobile + Online 2024          | <b>53,70%</b> | <b>18,26%</b>    | <b>21,09%</b> | <b>6,96%</b>  |
| Phone + Personal contact 2022 | 3,77%         | 4,72%            | 50,47%        | 41,04%        |
| Phone + Personal contact 2024 | <b>3,70%</b>  | <b>10,22%</b>    | <b>45,87%</b> | <b>40,22%</b> |

Source: Own research.

The results indicate that there has been no significant change in our preferences, but one aspect is worth noting. In 2022, 22% of respondents answered that they rarely or never use digital contact. In 2024, by contrast, the percentage rose to 27%. This suggests that fewer respondents are now digitally excluded. This shift is likely influenced by the increasing necessity for consumers to manage their affairs online, as more services transition away from traditional, physical forms. As of the end of March 2024, there were 9,900 bank branches in Poland, 276 fewer than a year earlier (Boczoń, 2024). Despite the declining number of branches, they are not expected to disappear completely anytime soon—customers still expect a hybrid experience. This is especially true given that, despite significant investments in customer experience (CX), the perceived improvement by customers remains limited (Clarke, 2024).

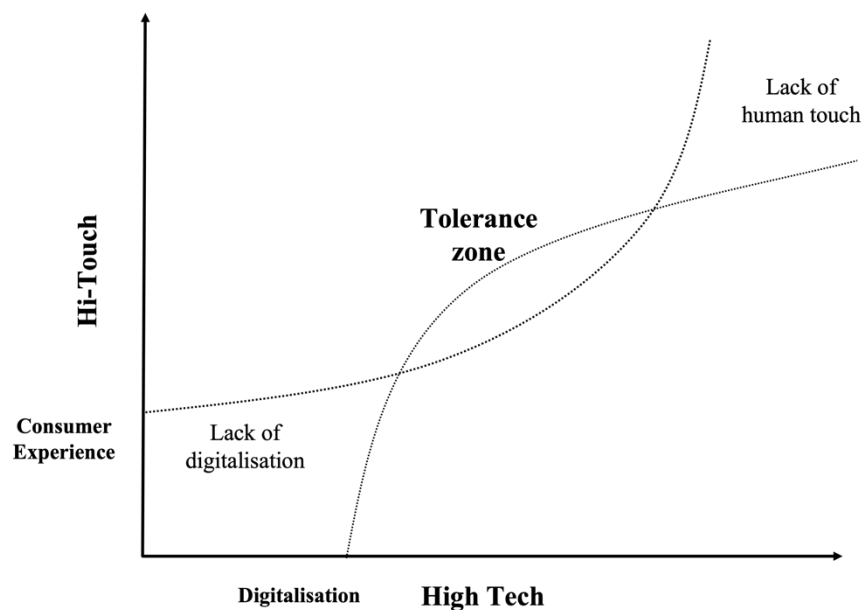
The shift toward digital channels is evident to varying degrees across all areas. This trend is also supported by other publications on the topic. One of the key areas of interest in the present study is the use of digital channels for medical consultations. Similar to many other areas, there is a clear increase in the usage and trust in these tools compared to 2022. This topic has been gaining significant attention in recent years, as evidenced by the growing number of publications on Online Medical Consultation (OMC) (Lu et al., 2024). Studies that delve deeper into customer behavior during the travel purchase process and its impact on the business models of online companies provide fascinating insights. These studies help us understand how consumer preferences and habits are evolving and how online travel companies are adapting their strategies to meet these changing demands (Angeloni, Rossi, 2021).

Digitalization is progressing rapidly, benefiting companies in many areas, especially financially. A good example is the increasing use of conversational AI. Many companies, particularly in the B2C sector, are incorporating this technology into their customer service. Perhaps the most well-known tool in this context is chatbots, which automate numerous processes by replacing human interaction.

The biggest challenge for companies adopting conversational AI is maintaining a high-quality customer experience. This involves more than just managing the digital interface; AI tools mimic and replace live customer service employees, ultimately affecting brand perception. Therefore, companies must carefully choose and implement these tools to ensure their image does not suffer from poor customer interactions (Ball, 2023). According to research conducted by Forrester, AI will be one of the dominant technologies used by the banking industry in the future (Bennet, Morgan, 2024). AI is expected to revolutionize customer service,

and its presence is becoming increasingly widespread. However, there is still a lack of research that explains the effects of AI on the quality of these changes (Ameen et al., 2021).

The previous edition of the study developed a model based on Aga Szóstek's *umami strategy*. According to her, there is a 'zone of tolerance' where consumers exist, positioned between the expected and actual experience they receive. The author has extended and adapted this concept into the 'High-Tech vs. High-Touch Tolerance Zone,' where consumers experience a balance of digital innovation and human interaction. Recent research underscores the relevance of this concept—while consumers increasingly value the convenience of technology, they still expect and appreciate human contact.



**Figure 14.** High-Tech vs High Touch Tolerance Zone.

Source: Kordecki, 2022.

## 5. Conclusion

All major findings from the 2022 study were reaffirmed in 2024. Digitalization remains an unstoppable trend affecting all aspects of life, with consumers generally favoring digital interactions with brands when they offer clear benefits. However, for more personal or complex issues, face-to-face interactions are still preferred. Companies are advised to balance digital and in-person communication, as excessive digitalization can negatively impact the customer experience.

While the trend toward digitalization is unsurprising, a notable shift has occurred in consumer behavior. The percentage of people who rarely or never use digital channels has significantly decreased, while similar responses for traditional channels like phone or in-person

contact have increased. This suggests that a growing number of people are increasingly embracing digital channels. Factors beyond demographics, such as the decline in phone use due to robocalls, fraud, and phishing attempts, are also driving this shift.

Another key finding is the evolving definition of digital channels. The distinction between digital and traditional channels is blurring, particularly between mobile device communication and traditional internet access via computer browsers. This division is losing relevance and may soon be obsolete in future studies.

The 2024 study involved a larger and more diverse group but is not representative of the general population. The survey focused on informed, frequent users of digital media, conducted online, which naturally excluded those who are digitally disconnected. This exclusion, however, aligns with the study's focus.

The results indicate that brands aiming to introduce more advanced digital services must prioritize understanding their customers. Often, transformation projects focus on design, implementation, and testing, overlooking the critical first step of deeply understanding consumer needs and behavior. Researchers and consultants from the research firm recommend using a coordinated approach to digital adaptation using a roadmap that systematizes and organizes the process (Dahlgren, 2023).



**Figure 15.** Roadmap for digital adoption.

Source: Dahlgren, 2023.

Digitalization is progressing, with functionalities expanding and integrating seamlessly into daily life. The process feels more evolutionary than revolutionary. The study's findings affirm its relevance while suggesting that future editions should adapt to ongoing technological and social changes.

At the same time, it's important to acknowledge the growing recognition of the negative consequences of digitization. Once viewed as an entirely positive and innovative trend, it also has its downsides, which should be mitigated. Top-down initiatives can play a significant role in addressing these issues. A notable example is the European Union's Industry 5.0 policy, which prioritizes sustainable, human-centric, and resilient industrial development across Europe.

## References

1. Ameen, N., Tarhini, A., Reppel, A., Anand, A. (2021). Customer experiences in the age of artificial intelligence. *Computers in Human Behavior*, 114, 106548.
2. Angeloni, S., Rossi, C. (2021). Online search engines and online travel agencies: A Comparative Approach. *Journal of Hospitality & Tourism Research*, 45(4), 720-749.
3. Ball, M. (2023). *The Conversational AI For Customer Service Landscape, Q4 2023*. Forrester. Retrieved from: <https://www.forrester.com/report/the-conversational-ai-for-customer-service-landscape-q4-2023/RES180086>, 15.06.2024.
4. Bennet, M., Morgan, J. (2024). *The Top Emerging Technologies In Banking, 2024*. Forrester. Retrieved from: <https://www.forrester.com/report/the-top-emerging-technologies-in-banking-2024/RES180685>, 20.04.2024.
5. Brodny, J., Tutak, M. (2022). Analyzing the level of digitalization among the enterprises of the European Union member states and their impact on economic growth. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(2), 70.
6. Clarke, A. (2024). *Consumer Banking Trends, 2024 Trends Shaping Retail Consumer Banking In The Current Economic Climate*. Forrester. Retrieved from: <https://www.forrester.com/report/consumer-banking-trends-2024/RES180392>, 10.06.2024.
7. Conlin, R., Labban, A. (2019). Clustering attitudes and behaviors of high/low involvement grocery shopper. *Journal of Food Products Marketing*, 25(6), 647-667.
8. Dahlgren, W. (2023). *The Digital Adoption Roadmap How You Can Drive Adoption Of Your Digital Experience*. Forrester. Retrieved from: <https://www.forrester.com/report/the-digital-adoption-roadmap/RES180188?>
9. Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.

10. De Keyser, A., Lemon, K.N., Klaus, P., Keiningham, T.L. (2015). A framework for understanding and managing the customer experience. *Marketing Science Institute Working Paper Series*, 85(1), 15-121.
11. Grybauskas, A., Stefanini, A., Ghobakhloo, M. (2022). Social sustainability in the age of digitalization: A systematic literature Review on the social implications of industry 4.0. *Technology in Society*, 70, 101997.
12. Güler-Bıyıklı, S. (2024). *Build Effective Research Partnerships To Ensure Impact. Best Practice Report*. Forrester. Retrieved from: <https://www.forrester.com/report/build-effective-research-partnerships-to-ensure-impact/RES181125>, 10.07.2024.
13. Haefner, L., Sternberg, R. (2020). Spatial implications of digitization: State of the field and research agenda. *Geography Compass*, 14(12), e12544.
14. Holmlund, M., Van Vaerenbergh, Y., Ciuchita, R., Ravald, A., Sarantopoulos, P., Ordenes, F. V., Zaki, M. (2020). Customer experience management in the age of big data analytics: A strategic framework. *Journal of Business Research*, 116, 356-365.
15. Ionescu-Feleagă, L., Ionescu, B.Ş., Stoica, O.C. (2023). The link between digitization and the sustainable development in European union countries. *Electronics*, 12(4), 961.
16. Keiningham, T., Aksoy, L., Bruce, H.L., Cadet, F., Clennell, N., Hodgkinson, I.R., Kearney, T. (2020). Customer experience driven business model innovation. *Journal of Business Research*, 116, 431-440.
17. Kordecki, B. (2022). High-tech Vs High Touch-Challenges in Managing the Consumer Experience with Brands in the Digital Age. *Zeszyty Naukowe. Organizacja i Zarządzanie/Politechnika Śląska*, 163, 235-251.
18. Kotler, P., Pfoertsch, W., Sponholz, U. (2023). *H2H Marketing: Case Studies on Human-to-Human Marketing*. Springer, 22.
19. Kotler, P. *A Lifetime in Marketing: Lessons Learned and the Way Ahead*, by Philip Kotler. Retrieved from: <https://www.ama.org/2024/03/12/a-lifetime-in-marketing-lessons-learned-and-the-way-ahead-by-philip-kotler/>, 28.03.2024.
20. Loebbecke, C., Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149-157.
21. Liu, J., Walsh, C. (2023). *The State Of Consumer Personalization, 2023 Consumers And Companies Have Different Views Of Personalization*. Forrester. Retrieved from: <https://www.forrester.com/report/the-state-of-consumer-personalization-2023/RES180120>, 10.04.2024.
22. Lu, W., Ngai, C.S.B., Yi, L. (2024). A bibliometric review of constituents, themes, and trends in online medical consultation research. *Health Communication*, 39(2), 229-243.
23. Monoarfa, T.A., Sumarwan, U., Suroso, A.I., Wulandari, R. (2024). *Uncover the trends, gaps, and main topics on online grocery shopping: Bibliometric analysis*. Heliyon.

24. Osterwalder, A., Pigneur, Y., Bernarda, G., Smith, A. (2015). *Value proposition design: How to create products and services customers want*. John Wiley & Sons.
25. Pauwels, K., Neslin, S.A. (2015). Building with bricks and mortar: The revenue impact of opening physical stores in a multichannel environment. *Journal of Retailing*, 91(2), 182-197.
26. Boczoń, W. (2024). Raport: Liczba placówek bankowych – I kwartał 2024 r. *Puls Biznesu*. Retrieved from: <https://www.pb.pl/raport-liczba-placowek-bankowych-i-kwartal-2024-r-1218661>, 10.07.2024.
27. Ross, J. (2014). *The business value of user experience*. Cranbury: D3 Infragistics.
28. Scarpi, D., Pizzi, G., Matta, S. (2022). Digital technologies and privacy: State of the art and research directions. *Psychology & Marketing*, 39(9), 1687-1697.
29. Singh, C., Dash, M.K., Sahu, R., Kumar, A. (2024). Investigating the acceptance intentions of online shopping assistants in E-commerce interactions: Mediating role of trust and effects of consumer demographics. *Heliyon*, 10(3).
30. Sward, D., Macarthur, G. (2007, September). Making user experience a business strategy. In: E. Law et al. (ed.), *Proceedings of the Workshop on Towards a UX Manifesto, Vol. 3*, pp. 35-40.
31. Varon, L., Murgia, N. (2024). *The State Of The US Consumer And Payments*. Forrester. *Data Overview Report*. Retrieved from: [https://www.forrester.com/report/the-state-of-the-us-consumer-and-payments/RES180515?ref\\_search=3512885\\_1713864133083](https://www.forrester.com/report/the-state-of-the-us-consumer-and-payments/RES180515?ref_search=3512885_1713864133083), 10.03.2024.
32. Verhoef, P.C., Kannan, P.K., Inman, J.J. (2015). From multi-channel retailing to omni-channel retailing: introduction to the special issue on multi-channel retailing. *Journal of Retailing*, 91(2), 174-181.

## THE EMPLOYEE EXPERIENCE'S PARADIGM APPLICABILITY IN RELATION TO HYBRID AND REMOTE WORKING

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**Purpose:** The purpose of the study is to identify instruments for shaping positive employee experience in hybrid and remote working environments. The following research questions were formulated: Can the experience modules – sensory, emotional, intellectual, behavioural and relational – be used to explore the possibility of shaping the positive employee experience of hybrid and remote employees? Using the experience modules, can the supervisor shape the positive experience of hybrid and remote employees?, Are there differences between the possibility of shaping the positive experience of hybrid and remote employees?

**Design/methodology/approach:** A critical analysis of the literature, a diagnostic survey method and a statistical method were used to answer the researcher's questions. The subject of the study is instruments for shaping a positive employee experience in hybrid and remote working environments.

**Findings:** The results of the study confirmed that the sensory, emotional, intellectual, behavioural and relational experience modules can be used as instruments to shape positive hybrid and remote employee experience. They also showed differences in the assessment of the applicability of the different instruments to hybrid and remote employees.

**Research limitations/implications:** A limitation of the study is the non-random sampling and the small number of respondents. However, despite these limitations, the study may inspire further in-depth research into the (digital) employee experience issue.

**Practical implications:** On the basis of the study conducted, recommendations of a practical nature can be made regarding the possibilities of shaping a positive employee experience for hybrid and remote employees. The proposed catalogue of instruments may be useful to those in managerial roles who recognise the need to shape the employee experience of hybrid and remote employees. Managers should be aware of the importance of positive employee experiences for human resource management practice, especially for attracting valuable employees, retaining and developing them, motivating them to work and increasing their commitment.

**Originality/value:** The issue of employee experience is relatively new and rarely addressed by researchers in Poland. The study extended the research on employee experience to hybrid and remote employees. The results obtained contribute to the literature on employee experience, hybrid working and remote working. They provide a better understanding of the differences regarding the possibilities for shaping the employee experience of hybrid and remote employees. They can be of value to both theoreticians and practitioners of human resource management.

**Keywords:** employee experience, digital employee experience, hybrid work, remote work.

**Category of the paper:** Research paper.

## 1. Introduction

In recent years, as a result of the digital transformation, flexible forms of work organisation such as hybrid working and remote working have become more widely used. The process of implementing them in organisations grew by leaps and bounds during the pandemic, when they became – where the nature of the work allowed it – a necessity during periods of lockdown. Remote working is a form of work organisation in which work is provided at a location other than the default place of work (i.e. outside the organisation's headquarters) using means of remote communication (Król, 2023). Hybrid working, on the other hand, is a combination of stationary and remote working (Król, 2024). At the time of the pandemic, it was assumed that after the end of the pandemic both forms of work organisation would become permanent elements of the labour market (Wrycza, Maślankowski, 2020), a kind of 'new normal', and their development trend will continue (Ng et al., 2022). Indeed, after the pandemic, hybrid and remote working has found a permanent place in organisational practice in Poland, although according to the latest data published by the Central Statistical Office (GUS, 2023), the extent of remote working in Poland is not large. At the same time, a number of studies (Kozioł-Nadolna, Suchocka, 2021; Król, 2022; Pełczewski, 2021; Wiśniewski, 2023) indicate that employees value the opportunity to work especially in a hybrid system. However, thanks to the solutions introduced in the Labour Code (Kodeks pracy, 2023), also employees who, as a rule, work at the employer's premises can benefit from so-called occasional remote working, which broadens the spectrum of people whose work experience changes. As a result of these changes, employees have begun to acquire new experiences related not only to the use of modern technology in the workplace, but also to the performance of work at home.

The aim of the study is to identify instruments for shaping a positive employee experience in hybrid and remote working environments. The research process sought answers to the following research questions:

- Can the experience modules - sensory, emotional, intellectual, behavioural and relational - be used to explore opportunities for shaping positive experiences for employees working hybrid and remotely?
- With the help of experience modules, can a supervisor shape a positive experience for hybrid and remote employees?
- Are there differences between the ability to shape positive experiences for hybrid and remote employees?



The structure of the study was subordinated to obtaining answers to the above research questions. For this purpose, the following research methods were used: a critical analysis of the literature on the subject, a diagnostic survey method (CAVI) and a statistical method.

## 2. Employee experience – a literature review

"Employee experience" (EX) is a management concept that puts the employee first. Morgan (2017), who is considered a pioneer of this concept, views positive employee experience as a product of an organisation's cultural, physical and technological environment, all of which influence employees' assessment of the workplace relating to its positive aspects. These three areas are the source of employee experience from the moment an employee joins an organisation until they leave. Morgan stresses that because employee experience is subjective in nature, which is determined by their perceptions, emotions, attitudes and behaviours, an organisation needs to get to know its employees well in order to shape a positive experience.

Plaskoff (2017) emphasises that in a market of experience there is not only a need to redefine the approach to human resources in the organisation, but also the relationship between employer and employee. Employees in a workplace form different groups with different expectations. Identifying these groups allows the organisation's management to shape the employee experience to match their expectations. In this view, employees are treated as consumers in the labour market. The benefit to the employee of a positive experience is satisfaction with the workplace. In contrast, an employer who applies human resource management practices that shape positive employee experiences gains engaged and productive employees, a good reputation in both internal and external labour markets (Soni et al., 2017), which can consequently have a positive impact on the retention of current employees and the ability to attract new valuable employees (Durai, King, 2018).

Mahadevan and Schmitz (2020) point out that employee experience should only be considered in a positive context. This is because it encompasses all the employee's interactions with the organisation from applying for a job, through onboarding, training, promotion and finally leaving the organisation (Panneerselvam, 2022). Thus, it refers to the entire 'journey' of an employee within an organisation (Başar, 2024). The basis of the measures taken regarding employee experience is to build a strong bond between the employee and the organisation, facilitated by the identification of the employee's needs and expectations. It should also be emphasised that employee experience is related to the feelings an employee has towards their employer (Tucker, 2020). Shaping positive employee experiences is also fostered by involving employees in management processes (Itam, Ghosh, 2020) and shared responsibility between employers and employees (Mohanty, Kulkarni, 2023).

According to Minkyung and Boyoung (2023), organisations should build a culture of trust, honesty and collaboration to shape positive employee experiences. It is important that employees in such an organisational culture feel safe, engaged, valued and supported. This requires personalised and authentic experiences that meet the individual needs and preferences of employees. In order to shape a positive employee experience, organisations should take a variety of measures, some of which include: building relationships with co-workers, promoting work-life balance, using fair compensation and management systems. Başar (2024) emphasises that an organisation seeking to maintain a sustainable competitive advantage in the marketplace should redesign human resource management practices to prioritise the employee experience, taking into account employees' emotions, ambitions and expectations.

A new approach to human resource management that takes into account the employee experience should also take into account the specific characteristics and expectations of the generation entering the labour market (Dolot, 2018; Schroth, 2019). For Generation Z employees, gaining new, positive experiences can not only have a motivational value, but also build their commitment to work. Employee engagement, not just from the youngest generation, may now be influenced more by opportunities for professional development and work-life balance than by additional financial rewards (Singh et al., 2023).

The concept of 'Employee Experience' is relevant in the context of the increasing prevalence of flexible working arrangements in the field of work regarding not only where, but also how and when people work (Panneerselvam, 2022). Flexible forms of work organisation such as hybrid working and remote working fit into this context. The development and application of digital technologies in work processes has contributed to the emergence of a new type of experience, known as digital employee experience (DEX). The digital employee experience is the holistic employee experience of the digital workplace supported by information technology (Ameu et al., 2024). It influences an employee's physical and mental wellbeing (Kong et al., 2019), their work performance, the experience offered to customers, and the organisation's financial performance (Panneerselvam, 2022).

As the results of the Global Human Capital Trends (2024) survey of 14,000 HR leaders from 95 countries show, many of the changes currently taking place in the labour market, such as the emergence of virtual worlds, the development of artificial intelligence, for example, or transformational changes in the way people think about work and where they work, are shaping the employee experience. For many organisations, the employee and their human capital are paramount, so leaders focus on their sustainability. On the other hand, the development of artificial intelligence may give rise to employees' fear of neglecting their development. However, as the results of the report show, employers in their operations are seeking to use modern technology to enhance employees' potential in more creative tasks. Shaping a positive employee experience is also fostered by implementing a micro-culture in the workplace. Microculture can refer to the introduction of small differences in the performance

of work in individual teams or different locations. These changes can influence better results in both individual and business activities. However, it is difficult to measure employee experience and estimate its impact on organisational performance. However, attempts to both construct appropriate indicators and make such measurements are being made (Itam, Ghosh, 2020).

The shaping of positive employee experiences can be studied and described, for example, on the basis of experience modules corresponding to specific experience types. The following five modules are distinguished: sensory, emotional, intellectual, behavioural and relational (Lipka, Król, 2021; Lipka, 2022). The sensory module in human resource management is related to influencing the employee's experience through his or her senses, i.e. through visual, auditory, gustatory, olfactory and tactile stimuli. The emotional module is related to maximising the positive and minimising the negative emotions of employees. The emotional experience of employees is part of their engagement. Greater engagement is associated with experiencing positive emotions such as satisfaction, contentment, joy, pride and a sense of fulfilment. In contrast, lower engagement occurs when experiencing negative emotions, e.g. anger, discouragement, frustration, disappointment, stress (Juchnowicz, Kinowska, 2023). The intellectual module is related to the completion of challenging professional tasks and the learning process. It also relates to the exchange of experiences between employees, attracting new employees increasing the creativity of teams, promoting non-standard ways of thinking, building a creative working environment (Pietruszka-Ortyl, 2023). The behavioural module is related to employee behaviour and how it is shaped. The relational module, on the other hand, is related to the formation of bonds between employees and between employees and the organisation. The relational module is linked to, among other things: conflict theory, managing intergenerational diversity, building workspace, using electronic tools for communication (Lipka, 2022).

### **3. Research procedure and method**

The research procedure was carried out in two steps. In a first step, four instruments each were identified from the literature analysis with which organisational managers can shape the positive experiences of hybrid and remote employees, under five modules: sensory, emotional, intellectual, behavioural and relational. A statistical method was then used to assess whether the adopted set of instruments is relevant and shapes the positive experiences of hybrid and remote employees.

In a second step, a diagnostic survey using an online survey technique was conducted between 16 January and 19 April 2024. The research tool was a survey questionnaire, which consisted of two tabular questions. In both questions, using a 5-point Likert scale (no, rather not, neither no nor yes, rather yes, yes), respondents rated a set of twenty instruments

shaping positive employee experiences, with the first question referring to hybrid employees and the second to remote employees.

The choice of the research sample was purposive. It consisted of people in leadership roles (owners, CEOs, directors, managers, team leaders), while also being supervisors of hybrid or remote employees. A total of 131 respondents took part in the survey, including 68 women (51.9%) and 63 men (48.1%). In terms of age of respondents, those aged 41-50 were the most represented, accounting for 41.2% of the survey sample. Respondents under the age of 40 accounted for 24.4% and those aged 51 and over for 24.4% of the total. The majority of respondents (97.7%) had a university degree, with the remaining 2.3% having a high school education. Respondents held management positions in organisations of varying sizes; from entities with up to nine employees (6.1%), through those with 10 to 49 (13.0%) and 50 to 499 (74.8%) employees, to those with 500 or more employees (6.1%). The majority of these were entities operating in the market for more than 10 years (94.7%).

#### **4. Shaping experiences and hybrid and remote working – survey results and discussion**

Using the concept of experience modules, twenty instruments were identified, four within each module, through which a supervisor can shape the experience of employees. There are five different modules:

##### **I. Sensory module:**

1. arranging the environment of the employee's workplace (e.g. through the colour scheme of the room, the aesthetics of the furnishings),
2. eliminating excessive acoustic stimuli (loud conversations of other employees, noise generated by equipment used in the work process),
3. the use of various virtual communicators in the communication process with employees,
4. taking care of the aesthetics of the word and linguistic politeness in conversations with staff.

##### **II. Emotional module:**

5. fostering a friendly working atmosphere,
6. enabling you to work with a competent and friendly colleague,
7. creating conditions for a good work-life balance,
8. alleviating the feeling of loneliness in doing one's job.

## III. Intellectual module:

9. supporting staff development aspirations,
10. creating opportunities to learn from other employees,
11. supporting the intergenerational exchange of experiences, e.g. through the use of mentoring,
12. fostering an atmosphere conducive to employee creativity and innovation.

## IV. Behavioural module:

13. organising staff team-building events,
14. accepting flexible and out-of-the-box behaviour from employees,
15. directly influencing employee behaviour,
16. eliminating excessive working hours by employees.

## V. Relational module

17. creating conditions for teamwork,
18. providing support to employees,
19. building staff confidence in the organisation,
20. building bonds between employees and between employees and the company.

The reliability of the highlighted set of instruments was then assessed using Cronbach's alpha reliability analysis ( $\alpha$ ). The values obtained for both hybrid working ( $\alpha = 0.872$ ) and remote working ( $\alpha = 0.925$ ) confirmed that the adopted set of instruments could be used to explore the possibilities of shaping the experiences of employees working hybrid and remote (Tab. 1). Thus, there was a positive answer to the first research question.

**Table 1.**  
*Statistics of reliability*

| Type of work | Alfa Cronbacha |
|--------------|----------------|
| Hybrid work  | 0.872          |
| Remote work  | 0.925          |

Source: Own elaboration.

Cronbach's alpha values were also calculated after excluding each instrument in turn from the set separately for the hybrid and remote work (Tab. 2). The values obtained after exclusion are close to the Cronbach's alpha total for hybrid working and Cronbach's alpha total for remote working, respectively, meaning that the exclusion of none of the instruments improved the level of reliability, and therefore all instruments shape the experiences of employees working hybrid and remotely.

**Table 2.***Reliability statistics after removal of the instrument in question for each type of work*

| No. | Name of instrument  | Cronbach's alpha after removal of the instrument |             |
|-----|---|--|-------------|
|     |   | hybrid work                                      | remote work |
| 1   | Arranging the environment of the employee's workplace (e.g. through the colour scheme of the room, the aesthetics of the furnishings) | 0.869  | 0.925       |
| 2   | Eliminating excessive acoustic stimuli (loud conversations of other employees, noise generated by equipment used in the work process) | 0.870  | 0.926       |
| 3   | The use of various virtual communicators in the communication process with employees  | 0.878  | 0.927       |
| 4   | Taking care of the aesthetics of the word and linguistic politeness in conversations with staff                                       | 0.865  | 0.922       |
| 5   | Fostering a friendly working atmosphere   | 0.866  | 0.920       |
| 6   | Enabling you to work with a competent and friendly colleague  | 0.869  | 0.921       |
| 7   | Creating conditions for a good work-life balance  | 0.869  | 0.924       |
| 8   | Alleviating the feeling of loneliness in doing one's job  | 0.864  | 0.920       |
| 9   | Supporting staff development aspirations  | 0.864  | 0.920       |
| 10  | Creating opportunities to learn from other employees  | 0.864  | 0.919       |
| 11  | Supporting the intergenerational exchange of experiences, e.g. through the use of mentoring   | 0.864  | 0.919       |
| 12  | Fostering an atmosphere conducive to employee creativity and innovation   | 0.861  | 0.918       |
| 13  | Organising staff team-building events   | 0.867  | 0.924       |
| 14  | Accepting flexible and out-of-the-box behaviour from employees  | 0.879  | 0.925       |
| 15  | Directly influencing employee behaviour   | 0.862  | 0.921       |
| 16  | Eliminating excessive working hours by employees  | 0.864  | 0.921       |
| 17  | Creating conditions for teamwork  | 0.857  | 0.918       |
| 18  | Providing support to employees  | 0.865  | 0.919       |
| 19  | Building staff confidence in the organisation   | 0.863  | 0.920       |
| 20  | Building bonds between employees and between employees and the company  | 0.860  | 0.920       |

Source: Own elaboration.

For the purpose of assessing which instruments respondents felt could be used to shape the positive experiences of those working hybrid and those working remotely, a categorisation of the rating scale was introduced (no and rather no – cannot be shaped; neither no nor yes – neutral; rather yes and yes – can be shaped).

Respondents were more likely to cite the ability to shape a positive experience for hybrid than remote employees. The percentage of indications confirming the possibility of shaping positive experiences ranged from 51.9% to 96.9% for hybrid working and from 16.8% to 91.6% for remote working (Tab. 3). According to respondents, the greatest opportunity for shaping a positive experience for those working hybrid is 'shaping a positive working atmosphere' (96.9%); for those working remotely, this is the seventh indication (76.3%). Instruments such as: "providing support to employees" (95.4%), "building employees' trust towards the organisation" (95.4%), "creating conditions for reconciling work and private life" (94.7%), "taking care of the aesthetics of words and linguistic politeness in conversations with employees" (93.9%), "supporting employees' development aspirations" (93.9%), "fostering an atmosphere that encourages employees' creativity and innovation" (93.9%), "creating

opportunities to learn from other employees" (93.1%), "enabling work to be done with a competent and friendly co-worker" (90.1%) and "supporting the intergenerational exchange of experience, e.g. through the use of mentoring" (90.0%). Respondents attributed the least opportunity to directly influencing employee behaviour (51.9%). For those working remotely, the assessment of the feasibility of using the same instruments was lower and only for one at above 90%. The highest-rated instrument was 'attention to the aesthetics of words and linguistic politeness in conversations with employees' (91.6%). In the context of hybrid employees, this instrument ranked fifth. The possibility of shaping a positive experience for remote employees was rated relatively high - above 80% - with instruments such as: "creating conditions for reconciling work and private life" (84.0%), "supporting employees' development aspirations" (83.2%), "providing support to employees" (81.7%), "building employees' trust towards the organisation" (80.9%) and "using various virtual communicators in the communication process with employees" (80.1%). On the other hand, the least potential was found in reducing loneliness at work (45.0%), directly influencing employees' behaviour (29.8%), eliminating excessive acoustic stimuli (loud conversations of other employees, noise generated by equipment used in the work process) (27.5%) and, above all, arranging the employee's work environment (e.g. through the colour scheme of the room, aesthetics of equipment) (16.8%). The results confirm that it is possible to shape the positive experiences of hybrid and remote employees using experience modules, and that there are differences in the ability to shape the experiences of these two groups of employees, thus answering the second and third research questions.

**Table 3.**

*Assessing opportunities to shape positive experiences for people working hybrid and remotely*

| No. | Name of instrument  | Hybrid work |      |      | Remote work |      |      |
|-----|---|-------------|------|------|-------------|------|------|
|     |   | -*          | -/+  | +    | -           | -/+  | +    |
| 1   | Arranging the environment of the employee's workplace (e.g. through the colour scheme of the room, the aesthetics of the furnishings) | 16.8        | 9.9  | 73.3 | 71.8        | 11.4 | 16.8 |
| 2   | Eliminating excessive acoustic stimuli (loud conversations of other employees, noise generated by equipment used in the work process) | 8.4         | 3.8  | 87.8 | 62.6        | 9.9  | 27.5 |
| 3   | The use of various virtual communicators in the communication process with employees  | 9.9         | 16.8 | 73.3 | 10.7        | 9.2  | 80.1 |
| 4   | Taking care of the aesthetics of the word and linguistic politeness in conversations with staff                                       | 0.8         | 5.3  | 93.9 | 3.8         | 4.6  | 91.6 |
| 5   | Fostering a friendly working atmosphere   | 0.8         | 2.3  | 96.9 | 10.7        | 13.0 | 76.3 |
| 6   | Enabling you to work with a competent and friendly colleague  | 1.5         | 8.4  | 90.1 | 12.2        | 15.3 | 72.5 |
| 7   | Creating conditions for a good work-life balance  | 2.3         | 3.0  | 94.7 | 7.6         | 8.4  | 84.0 |
| 8   | Alleviating the feeling of loneliness in doing one's job  | 13.0        | 19.1 | 67.9 | 31.3        | 23.7 | 45.0 |
| 9   | Supporting staff development aspirations  | 1.5         | 4.6  | 93.9 | 4.6         | 12.2 | 83.2 |
| 10  | Creating opportunities to learn from other employees  | 1.5         | 5.4  | 93.1 | 15.3        | 13.7 | 71.0 |
| 11  | Supporting the intergenerational exchange of experiences, e.g. through the use of mentoring   | 0.8         | 9.2  | 90.0 | 18.3        | 13.0 | 68.7 |
| 12  | Fostering an atmosphere conducive to employee creativity and innovation   | 1.5         | 4.6  | 93.9 | 13.7        | 13.7 | 72.6 |

Cont. table 3.

|    |  |      |      |      |      |      |      |
|----|--|------|------|------|------|------|------|
| 13 | Organising staff team-building events                                  | 11.5 | 21.3 | 67.2 | 24.4 | 12.2 | 63.4 |
| 14 | Accepting flexible and out-of-the-box behaviour from employees         | 11.5 | 24.4 | 64.1 | 16.8 | 25.2 | 58.0 |
| 15 | Directly influencing employee behaviour                                | 19.9 | 28.2 | 51.9 | 40.4 | 29.8 | 29.8 |
| 16 | Eliminating excessive working hours by employees                       | 10.7 | 14.5 | 74.8 | 33.6 | 15.2 | 51.2 |
| 17 | Creating conditions for teamwork                                       | 3.8  | 10.7 | 85.5 | 22.9 | 20.6 | 56.5 |
| 18 | Providing support to employees   | 0.0  | 4.6  | 95.4 | 8.4  | 9.9  | 81.7 |
| 19 | Building staff confidence in the organisation                          | 1.5  | 3.1  | 95.4 | 9.2  | 9.9  | 80.9 |
| 20 | Building bonds between employees and between employees and the company | 9.2  | 9.2  | 81.6 | 17.6 | 13.7 | 68.7 |

\* – cannot shape (sum of 'no' and 'rather not' answers).

-/+ – neutral (answer 'neither yes nor no')

+ – can shape (sum of "rather yes" and "yes" answers).

Source: Own elaboration.

Although assessing the (digital) employee experience is important for organisations, research on this issue is still at an early stage. So far, neither models nor specific frameworks relating to (digital) employee experience have been developed. Attempts to rank the factors shaping employee experience are few and varied. One attempt was made by Panneerselvam (2022), who included among the elements of employee experience: meaningful work, a supportive culture, supportive technology, flexible HR processes and practices, and inclusive leadership. A different approach was presented by Başar (2024), according to whom the employee experience consists of manager support and cooperation, organisational identification and development, and career-oriented HR practices. In contrast, Ameu et al. (2024) proposed a different set of (digital) employee experience components, including: business strategy, technology, physical environment, leadership, career, brand and organisational culture.

No studies of employee experience of hybrid and remote employees implemented using the five experience modules were encountered in the course of the literature analysis. Therefore, a discussion of the results obtained and their comparison with other studies is not possible. Instead, the study presented here can be seen as a pilot study to test the research tool.

## 5. Summary

Research has shown that the following experience modules can be used to explore the possibilities of shaping positive experiences of hybrid and remote employees: sensory, emotional, intellectual, behavioural and relational.

Using appropriately selected instruments within the experience modules, the supervisor can shape the employee experience of both hybrid and remote employees. According to respondents, there are differences in the opportunities to shape positive experiences for hybrid and remote employees, with the opportunities being greater for hybrid working. Thus, a different configuration of instruments should be used to shape positive experiences for



hybrid and remote employees. In both cases, the shaping of experiences within the intellectual and emotional modules is more important than the relational and sensory, and especially the behavioural. The differences in assessing the potential for hybrid and remote employees to shape positive experiences are due to their different working arrangements - in the former case, both on-site and off-site; in the latter, exclusively off-site.

Both managers and HR professionals should be aware of the importance of positive employee experiences and how they are shaped, especially in the age of the experience market, for the entire HR management process and, above all, for attracting valuable employees, retaining and developing them, motivating them to work and increasing their commitment. It is therefore worthwhile to continue researching the employee experience in relation to employees providing a service of work wholly or partly outside the employer's premises.

## References

1. Ameu, N.C., Yusoff, R.C.M., Rahim, N.Z.A., Ibrahim, R., Zainuddin, N.M. (2024). Content Validity For Digital Employee Experience Assessment. *Procedia Computer Science*, Vol. 234, pp. 1288-1295, doi: 10.1016/j.procs.2024.03.126.
2. Bařar, D. (2024). The relationship between employee experience and employee engagement with the moderating role of positive affect in finance sector. *Borsa Istanbul Review*, doi: 10.1016/j.bir.2024.05.002.
3. Dolot, A. (2018). The characteristics of Generation Z. *e-mentor*, No. 2(74), pp. 44-50, doi: 10.15219/em74.1351.
4. Durai, T., King, R. (2018). Employee Experience and its influence on employee engagement – with reference to innovative tech companies in Chennai. *Shanlax International Journal of Management*, Vol. 5, Iss. 4, pp. 276-280.
5. *Global Human Capital Trends* (2024). Raport Deloitte, luty 2024. Retrieved from: <https://pl.register-deloittece.com/forms/registration.html?docid=486>, 15.07.2024.
6. GUS (2023). *Popyt na pracę w pierwszym kwartale 2023 r.* Retrieved from: <https://stat.gov.pl/obszary-tematyczne/rynek-pracy/popyt-na-prace/popyt-na-prace-w-1-kwartale-2023-roku,2,50.html>, 04.08.2024.
7. Itam, U., Ghosh, N. (2020). Employee experience management: A new paradigm shift in HR thinking. *International Journal of Human Capital and Information Technology Professionals (IJHCITP)*, No. 11(2), pp. 39-49, doi: 10.4018/IJHCITP.2020040103.
8. Juchnowicz, M., Kinowska, H. (2023). Wpływ doznań emocjonalnych pracowników na jakořć kapitału ludzkiego. *Zarządzanie Zasobami Ludzkimi*, Nr 152(3-4), pp. 31-46, doi: 10.5604/01.3001.0053.8932.

9. *Kodeks pracy* (2023). Retrieved from: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU19740240141>, 4.08.2024.
10. Kong, F.Z., Zhao, L., Zhang, X.B., Tsai, C.H., Lin, D. D. (2019). Farmers' work-life quality and entrepreneurship will in China. *Frontiers in psychology*, No. 10(787), doi: 10.3389/fpsyg.2019.00787.
11. Koziół-Nadolna, K., Suchocka, A. (2021). *Uwarunkowania pracy zdalnej w organizacjach w czasie pandemii COVID-19*. Szczecin: Wyd. Uniwersytetu Szczecińskiego.
12. Król, M. (2022). *Praca zdalna – cechy, uwarunkowania, implikacje dla procesu pracy*. Katowice: Wyd. Uniwersytetu Ekonomicznego w Katowicach, doi: 10.22367/uekat.9788378758174.
13. Król, M. (2023). Rynek pracy zdalnej w Polsce w latach 2020-2022. *Rynek Pracy*, No. 186(3), pp. 52-68, doi: 10.5604/01.3001.0053.9215.
14. Król, M. (2024). *Rynek pracy w kontekście zmian pokoleniowych i cyfryzacji*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.
15. Lee, M., Kim, B. (2023). Effect of Employee Experience on Organizational Commitment: Case of South Korea. *Behavior Science*, Vol. 13, Iss. 521, doi.org: 10.3390/bs13070521.
16. Lipka, A. (2023). Employee Experience Models – a Comparative Analysis. Notes on the Methodology of Global Research on Employees Experiences and Their Perceptions of the Meaning of Work. *Folia Oeconomica Acta Universitatis Lodziensis*, No. 3(364), pp. 51-75, doi: 10.18778/0208-6018.364.04.
17. Lipka, A. (2022). *Employee Experience. Zarządzanie kapitałem ludzkim w kategoriach rynku doznań*. Warszawa: PWE.
18. Lipka, A., Król, M. (2021). *Rynek doznań. Moduły doświadczeń podczas tworzenia i percepcji ilustracji*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach.
19. Mahadevan, J., Schmitz, A.P. (2020). HRM as an ongoing struggle for legitimacy: A critical discourse analysis of HR managers as “employee-experience designers”. *Baltic Journal of Management*, No. 15(4), pp. 515-532, doi: 10.1108/BJM-10-2018-0368.
20. Minkyung, L., Boyoung, K. (2023). Effect of Employee Experience on Organizational Commitment: Case of South Korea. *Behavior Science*, No. 13(7), 521, doi: 10.3390/bs13070521.
21. Mohanty, V., Kulkarni, M.B. (2023). Employee experience-disruptive approach to employee engagement. *International Journal of Management Concepts and Philosophy*, No. 16(3), pp. 195-210, doi: 10.1504/IJMCP.2023.131753.
22. Morgan, J. (2017). *The employee experience advantage: How to win the war for talent by giving employees the workspaces they want, the tools they need, and a culture they can celebrate*. John Wiley & Sons. Retrieved from: <https://books.google.pl/books?id=nT5GDgAAQBAJ>, 14.07.2024.

23. Ng, P.M.L., Lit, K.K., Cheung, C.T.Y. (2022). Remote work as a new normal? The technology-organization-environment (TOE) context. *Technology in Society*, No. 70(102022), pp. 1-8, doi: 10.1016/j.techsoc.2022.102022.
24. Panneerselvam, S. (2022). Employee experience: The new employee value proposition. *Strategic HR Review*, No. 21(1), doi: 10.1108/SHR-08-2022-0047.
25. Pełczewski, M. (2021). Praca zdalna w warunkach pandemii COVID-19. Wyniki badania satysfakcji pracowników na przykładzie wybranego przedsiębiorstwa. In: I. Mendryk (ed.), *Zarządzanie zasobami ludzkimi w nowej przestrzeni fizycznej i społecznej* (pp. 208-220). Warszawa: Difin.
26. Pietruszka-Ortyl, A. (2023). Indywidualny kapitał intelektualny profesjonalisty – model konceptualny. *Humanitas Zarządzanie*, Nr 24(3), pp. 127-142, doi: 10.5604/01.3001.0054.0083.
27. Plaskoff, J. (2017). Employee experience: the new human resource management approach. *Strategic HR Review*, Vol. 16, No. 3, pp. 136-141, doi: 10.1108/SHR-12-2016-0108.
28. Schroth, H. (2019). Are You Ready for Gen Z in the Workplace? *California Management Review*, No. 61(3), pp. 5-18, doi: 10.1177/0008125619841006
29. Singh, R., Chaudhuri, S., Sihag, P., Shuck, B. (2023). Unpacking generation Y's engagement using employee experience as the lens: an integrative literature review. *Human Resource Development International*, No. 26(5), pp. 548-576, doi: 10.1080/13678868.2023.2170210.
30. Soni, K., Chawla, R., Sengar, R. (2017). Relationship between job satisfaction and employee experience. *Journal of General Management Research*, No. 4(2), pp. 41-48. Retrieved from: <https://www.scmsnoida.ac.in/assets/pdf/journal/vol4issue2/04%20Kanika%20Soni.pdf>, 15.08.2024.
31. Tucker, E. (2020). Driving engagement with the employee experience. *Strategic HR Review*, Vol. 19, No. 4, pp. 183-187, doi: 10.1108/SHR-03-2020-0023.
32. Wiśniewski, Z. (2023). Praca zdalna w Polsce w kontekście europejskim. *Zabezpieczenie społeczne. Teoria. Prawo. Praktyka*, No. 18, pp. 9-20, doi: 10.31971/2299-2332.2023.18.1.
33. Wrycza, S., Maślankowski, J. (2020). Social Media Users' Opinions on Remote Work during the COVID-19 Pandemic. Thematic and Sentiment Analysis. *Information Systems Management*, Vol. 37, No. 4, pp. 288-297, doi:10.1080/10580530.2020.1820631.



## MAPPING DIGITAL CULTURAL HERITAGE MUSEUMS IN POLAND

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**Purpose:** Digital cultural heritage has become inherent to the Polish cultural landscape, as evidenced by the growing attention digital cultural artefacts receive. The research objective is to build a map and list of places where digital cultural heritage artefacts are protected and made available to the public in Poland.

**Design/methodology/approach:** The article outlines a concept for a ‘Tourist Trail of Digital Cultural Heritage in Poland’. The trail links several dozen unique places that bear testimony to the history of technical development and associated socioeconomic phenomena. A pilot study, a partially structured interview survey, was conducted in the Museum of Electronics in Kraków. Having analysed source materials, the author compiled a list and a map of digital cultural heritage museums in Poland.

**Findings:** The map of the museums revealed a potential market niche and established a ‘Tourist Trail of Digital Cultural Heritage in Poland’. The pilot survey revealed that visitors to the Museum of Electronics in Kraków were interested in how archaic digital hardware looked and worked and also what was inside. It is a recommendation on how future museum exhibitions can be set up.

**Originality/value:** These are the first list and map of places that preserve and promote the memory of digital cultural heritage in Poland. It is also a starting point for the ‘Tourist Trail of Digital Cultural Heritage in Poland’. The tourist trail of digital cultural heritage is a unique tourist and cultural product aimed at preserving the memory of Polish and international computer thought.

**Keywords:** cultural heritage, map of museums, tourist trail, retrocomputing, retrogaming.

**Category of the paper:** research paper.

### 1. Introduction

Digital cultural heritage has become inherent to the Polish cultural landscape, as evidenced by the growing attention digital cultural artefacts receive (Rak, Pstrocka-Rak, 2023). In the first half of 2024 alone, two branches of private retrogaming and retrocomputing museums were opened in Poland: the Chorzów branch of the Museum of Electronics in Kraków and the Warsaw branch of the Kraków Arcade Museum (Król, 2024). The media expect similar

initiatives, such as a new museum in Łódź (Retro, 2024). The growing interest in digital cultural heritage and the number of places where digital cultural heritage artefacts are displayed as interactive exhibits lead to the research question about the role of digital cultural heritage museums and where they are the most numerous in Poland. Mapping digital cultural heritage museums in Poland may identify a market niche for new museums by revealing which voivodeships have no museums with digital artefacts, leading to the consideration of the 'Tourist Trail of Digital Cultural Heritage in Poland'.

The research objective is to build a list and map of digital cultural heritage museums in Poland as the underpinning for the 'Tourist Trail of Digital Cultural Heritage in Poland'. The study is part of the research project 'Mapping Digital Cultural Heritage Museums in Poland' (ref. DigiMap; K/658/2024/WRE) founded under the Regional Excellence Initiative scheme, contract No. RID/SP/0039/2024/01. The research topic is covered by the second REI domain: Cultural Heritage Management. It treats cultural heritage, including rural digital cultural heritage (Król, Zdonek, 2024), as a component of multi-functional and sustainable development, a token of entrepreneurship, and an inherent element of the urban cultural landscape.

Although the interest in digital cultural heritage is growing both in Poland and globally (Karp, 2014), there is still great room for improvement regarding the promotion, education, documentation, and preservation of digital artefacts, hardware and software heritage both (Król, 2021). The number of places displaying archaic digital hardware is growing in Poland and internationally. These are mostly grassroots projects established by private collectors and enthusiasts of retrocomputing and retrogaming. This community exhibits several unique characteristics, including 1) commitment: they are not sufficiently compensated for the time they contribute restoring archaic hardware even though many members of the community are or were IT specialists and 2) a high level of expertise: people involved in retrocomputing have expert skills due to their specialist education, experience, and studies or professional experience (Galloway, 2011). The dispersed and individualized nature of digital cultural heritage museums situated all over Poland makes it challenging to build a single consolidated list of such places. Their details can be found online described with various keywords, which does not help, either. This poses a particular research gap worth investigating.

The remainder of the article is structured as follows. Section two sheds light on the notion of the museum institution and how it operates in Poland. It also points out that digital cultural heritage is not just hardware and software but also places, people (communities), and socioeconomic and cultural phenomena. Section three contains the research methodology, and section four offers the results with a list of digital cultural heritage museums and conclusions from the partially structured interviews. Section five provides insights into the functioning of digital cultural heritage museums in Poland and globally. The summary points out that just like tourists are offered such products as wooden architecture routes, they should also be able to follow digital cultural heritage trails.

## 2. Background

Cultural heritage is a constantly evolving collection of tangible objects and symbols, cultural artefacts, heritage assets, and customs that are relevant to specific communities. Cultural heritage links the past to the future (Thwaites, 2013). It often forms a framework for belonging to a particular community or cultural group. Cultural heritage competence is essential for building and maintaining national, ethnic, or regional identity. Cultural heritage shows us how people have been using natural resources, building communities, and affecting ecosystems, space use, societal transformations, and cultural landscape for ages (Panelli, Tipa, 2007). What is more, knowledge of cultural heritage helps better understand the historical – socioeconomic and cultural – context of today’s developments (Thwaites, 2013). This is what Pawlikowski (1959, p. 82) wrote about cultural heritage in 1959: ‘Cultural artefacts of the eras gone by may be of great educational value for today’s generations as testimonies to the nation’s history. As true reflections of life, they shape, inter alia, the awareness of the man today, who finds it easier to learn the external world and comprehend their times thanks to being familiar with embodiments of the past culture.’

In Poland, cultural heritage is associated mostly with sacral objects, folklore, architecture, paintings, and sculptures. But it is not only about collections of things, roadside shrines, or monuments. It also covers traditions and customs handed down between generations, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe, or the knowledge and skills of traditional crafts. Intangible cultural heritage is the ‘heritage that is embodied in people rather than in inanimate objects’ (Logan, 2007). UNESCO defines intangible cultural heritage as ‘the practices, representations, expressions, as well as the knowledge and skills that communities, groups and, in some cases, individuals recognise as part of their cultural heritage’ (Intangible Heritage Convention) (UNESCO, 2003).

Tangible and intangible cultural heritage types are complemented by natural and digital heritage. Natural heritage ‘refers to natural features, geological and physiographical formations, and delineated areas that constitute the habitat of threatened species of animals and plants and natural sites of value from the point of view of science, conservation, or natural beauty. It includes private and public protected natural areas, zoos, aquaria, and botanical gardens, natural habitat, marine ecosystems, sanctuaries, reservoirs etc.’ (UNESCO, 1972). On the other hand, according to the Charter on the Preservation of the Digital Heritage (UNESCO, 2009), digital heritage ‘consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific, and administrative resources, as well as technical, legal, medical, and other kinds of information created digitally or converted into digital form from existing analogue resources. Where resources are born digital, there is no other format but the digital object. Digital materials include texts, databases, still and moving images, audio,

graphics, software and web pages, among a wide and growing range of formats. They are frequently ephemeral and require purposeful production, maintenance, and management to be retained' (UNESCO, 2009, p. 1).

## **2.1. Digital cultural heritage museums**

A museum is a non-profit organisation. Its objective is to collect and permanently protect assets of the natural and cultural heritage of humanity in both tangible and intangible forms, but also to inform about the value and content of the collections, promote fundamental values of history, science, and culture, mould cognitive and aesthetic sensitivity, and facilitate the usage of the collections (Act, 1996, Article 1). According to the International Council of Museums (ICOM, 2022), 'a museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets, and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally, and with the participation of communities, offering varied experiences for education, enjoyment, reflection, and knowledge sharing'.

In Poland, museums can be established by ministers, heads of central offices, local governments, natural persons, corporations, or unincorporated organisations (Act, 1996, Article 5.1). The minister for culture and protection of national heritage keeps a list of museums in the Public Information Bulletin. It contains the museum's name, office address, name of the creator (first and last name for natural persons), and the date the museum was listed in the State Register of Museums – a separate database on museum institutions – if the museum has been registered. The State Register of Museums aims to verify the high level of expertise and importance of the collections and to keep track of museums that meet these conditions. The Act (1996) requires that exhibits be protected and their integrity maintained. Each museum on the list or in the register should regularly and consistently strive to complete and expand the collection as per its policy, restore the functionality of the exhibits, engage in educational and research activities, train museum staff, record and publish history-related materials, and cooperate with parties that might provide support for all these operations (Pstrocka-Rak, Rak, 2021).

Although places where digital cultural heritage is preserved often include 'museum' in their names, they are not always supervised by the Ministry of Culture and National Heritage and listed in the State Register of Museums or the list of museums functioning under a statute or rules approved by the minister for culture and national heritage. The list of museums (List MCNH, 2024) (not to be confused with the State Register of Museums) enumerates the following museums of digital cultural heritage (as on 22.07.2024): 1) the Museum of the History of Computers and IT in Katowice (pending organisation) (item 463); 2) Museum of Computers and Games in Warsaw (pending organisation) (item 800); 3) Museum of Computers and Gaming Consoles in Osielsk (item 794), and 4) National Museum of Technology in



Warsaw (item 355). The list contains data on museums, the statute or rules of which have been approved by the minister for culture and national heritage under Article 6 of the Act on museums of 21 November 1996 (Act, 1996).

## **2.2. Digital cultural heritage museums as specialist tourism**

In general, landscape means ‘everything around us’ as a combination of attributes constituting a ‘real landscape content’ that affect the attractiveness of the explored area (Kozuchowski, 2005). One might believe that landscape and cultural landscape are mostly architectural objects in a natural, physical space that establish a ‘memory of things’ in an urban system, considering that ‘cultural memory needs places to be preserved’ (Górka, 2011, p. 249). Societal and cultural identities are linked to the awareness of the shared past and enhanced by access to it. The language of spatial forms provides a means for communication and sharing common history (Górka, 2011). ELWRO Square in Wrocław, commemorating Wrocławskie Zakłady Elektroniczne ELWRO from 1959-1993, is a distinct example of digital cultural heritage (Król, 2024).

Landscape is a complex phenomenon unique to a specific space (Nitkiewicz-Jankowska, Jankowski, 2010). In contrast, a cultural landscape embodies the ‘socialisation’ of the natural environment and its physiognomic expression (Leszczycki, 1977). The cultural landscape emerged as a result of human development and is still shaped by it. Therefore, this landscape has been transformed anthropogenically to such a degree that its continued existence can be secured only by a constant effort of people to keep it in the right state (Nitkiewicz-Jankowska, Jankowski, 2010). Furthermore, a cultural landscape emerges from the activities of multiple generations living in a specific area. Its forms retain the memory of past events, people, and places. The information about the past deposited there is handed down to new generations, which reintroduce them through their own interpretations and depictions (Górka, 2011). One must not forget intangible components of the cultural landscape, including such elements of culture, traditions, and heritage that have no physical form and yet significantly affect the shape and understanding of the specific cultural landscape. Evidently, landscape qualities can substantially affect various branches of tourism and the growth of entrepreneurship or, more broadly, socioeconomic and cultural development.

Landscape qualities are usually divided into recreational, tourist (natural and cultural), and specialist. The latter is considered the most important primary motive for travel. There is a certain specialist group of people who can be referred to as specialist tourists with knowledge of archaic (digital) computer hardware and an interest in technology history, retrogaming, and retrocomputing. The presence of a museum of technology or digital cultural heritage may be a driver of tourist activity and stimulate the tourism industry in the region. Digital technologies can be employed to create new artistic and cultural forms, such as digital art, computer games, films, animations, and various interactive media. These forms become part of today’s cultural landscape. As a result, digital cultural heritage is not just an accessory

to traditional heritage but plays a critical role in shaping the modern cultural landscape (Król, Hernik, 2022), driving its dynamic development and enhancement. Moreover, digital cultural heritage is an ‘extension’ of the natural ecosystem. The author believes that the digital ecosystem exhibits more similarities to the natural one that might at first appear, but not vice-versa. It means that the digital ecosystem, more precisely the online ecosystem, exhibits numerous analogies to the natural ecosystem. One could even risk a thesis that the digital (online) ecosystem is built according to principles similar to the natural ecosystem. Digital cultural heritage museums preserving archaic hardware and software are positioned at the interface of natural and digital spaces. The growing number of such places shows that they have become an inherent part of the cultural landscape, especially in urban areas where the Polish computer thought developed (Maćkowiak et al., 2018).

### **3. Materials and methods**

The research was conducted under the Mapping Digital Cultural Heritage Museums in Poland (DigiMap) project, REI project No. K/658/2024/WRE. The project is part of action 2.1 ‘Funding for mini-research projects. Support for management research and development relevant to regional socioeconomic environment’. The present study is part of a main project, ‘Improved potential of management and quality sciences through better use of Polish rural capital’, co-founded by the Republic of Poland under a Minister of Science scheme, ‘Regional Excellence Initiative’. A popular-science description of the research in Polish, a raster map, and an interactive map of the museums of digital cultural heritage in Poland, together with preliminary conclusions and results of a pilot study, were published on the website of the author and leader of DigiMap: <http://digitalheritage.pl/>. This article includes fragments of original works by the author published as white papers on the above-mentioned website.

The first stage involved study visits to selected digital cultural heritage museums where the author took photographs. The second stage was a partially structured interview survey. It involved curators ( $n = 2$ ) at the Museum of Electronics in Kraków and Gen Z representatives who visited the museum for the first time ( $n = 7$ ). The response sheets have been archived and are kept by the author.

The third main stage was a survey of facilities that preserve, display, and promote digital cultural heritage artefacts and places where the history of the Polish computer thought is documented and preserved. The focus was on organizations that display archaic electronics and software, host exhibitions of digital cultural heritage, and/or restore digital artefacts. The inventory was taken according to the list of museums kept by the Ministry of Culture and National Heritage of Poland (List MCNH, 2024) and scientific and popular science literature. In addition, online search engine searches were an important part of the work. The following

keywords in various combinations were used, some of them in Polish: ‘muzeum gier’ (museum of games), ‘retrogaming’, ‘retrocomputing’, ‘muzeum arcade’ (arcade museum), and ‘muzeum flipperów’ (pinball museum). The inventory is presented on (analogue and interactive) maps and as a table. During the research process, the author noticed that the ‘Tourist Trail of Digital Cultural Heritage in Poland’ emerged from the locations of the museums of digital cultural heritage.

## 4. Results and conclusions

### 4.1. Inventory of museum institutions

As on 5 August 2024, the author identified 33 places in total, including museums and paramuseum institutions involved in the protection of digital cultural heritage artefacts found in publications (scientific and popular science literature), public space, and the media. The greatest number of places of digital cultural heritage was found in urban agglomerations: Kraków, Warsaw, and Łódź. The voivodeships with the largest populations of museums of digital cultural heritage are Małopolskie, Dolnośląskie, Łódzkie, and Mazowieckie (Table 1). Their locations make up the digital cultural heritage trail starting in southern Poland and winding all the way up north to Pomerania.

**Table 1.**  
*Tourist Trail of Digital Cultural Heritage in Poland\**

| Voivodeship  | List of museums  |
|--------------|--|
| Małopolskie  | <ul style="list-style-type: none"> <li>a. RetroManiak – Muzeum Zabawek i Gier Komputerowych (Museum of Toys and Computer Games RetroManiak), Zakopane</li> <li>b. Muzeum Elektroniki w Krakowie (Museum of Electronics in Kraków)</li> <li>c. Kraków Pinball Museum</li> <li>d. Kraków Arcade Museum</li> <li>e. Muzeum Inżynierii i Techniki w Krakowie (Museum of Engineering and Technology in Kraków)</li> </ul>   |
| Śląskie      | <ul style="list-style-type: none"> <li>a. Muzeum Historii Komputerów i Informatyki w Katowicach (Museum of the History of Computers and IT in Katowice)</li> <li>b. Muzeum Elektroniki w Chorzowie (Museum of Electronics in Chorzów)</li> <li>c. FunHouse Katowice</li> </ul>   |
| Opolskie     | <ul style="list-style-type: none"> <li>a. Klubowe muzeum retro komputerów, gier i demosceny w Opolu (Club Museum of Retrocomputers, Games, and Demoscene)</li> </ul>   |
| Dolnośląskie | <ul style="list-style-type: none"> <li>a. Prywatne Muzeum Konsol Gier Video w Karpaczu (Private Museum of Consoles, Video Games in Karpacz)</li> <li>b. Laboratorium Retro Komputerów i Gier w Legnicy (Laboratory of Retrocomputers and Games in Legnica)</li> <li>c. Muzeum Gry i Komputery Minioniej Ery (Museum Games &amp; Computers of the Past Era), Wrocław</li> <li>d. Wirtualne Instytutowe Muzeum Komputerów Politechniki Wrocławskiej (Institute Virtual Museum of Computers of the Wrocław University of Technology)</li> <li>e. ELWRO square and memorial obelisk**</li> </ul> |

Cont. table 1.

|                     |   |
|---------------------|---|
| Łódzkie             | a. Muzeum Komputerów Osobistych w Łodzi (Museum of Personal Computers in Łódź)<br>b. Centrum Komiksu i Narracji Interaktywnej EC1 w Łodzi (Centre for Comics & Interactive Narration EC1 in Łódź)<br>c. Retro Gaming Club Łódź<br>d. Muzeum Komputerów i Gier w Pabianicach (Museum of Computers and Games in Pabianice)  |
| Mazowieckie         | a. Milanowskie Muzeum Gier i Komputerów (Milanówek Museum of Games and Computers)<br>b. Interaktywne Muzeum Flipperów Pinball Station (Interactive Museum of Pinball Machines Pinball Station)<br>c. Warszawskie Muzeum Komputerów i Gier (Warsaw Museum of Computers and Games)<br>d. Apple Museum Poland***<br>e. Narodowe Muzeum Techniki w Warszawie (National Museum of Technology in Warsaw)<br>f. Warszawskie Muzeum Arcade (Warsaw Arcade Museum) |
| Kujawsko-pomorskie  | a. Muzeum Uniwersyteckie UMK w Toruniu (IT Museum of the Nicolaus Copernicus University)<br>b. Muzeum Konsol i Gier Wideo w Bydgoszczy (Museum of Consoles and Video Games in Bydgoszcz)  |
| Zachodnio-pomorskie | a. Cyfrozaury. Komputery z poprzedniej epoki (Digisaurs. Computers from the Previous Era), Szczecin   |
| Pomorskie           | a. Flipper Stacja Gdańsk – Pinball & Arcade Games Room (Pinball Station Gdańsk)<br>b. PIXELMANIA, Władysławowo  |
| Warmińsko-mazurskie | a. Arcade Classics Muzeum w Elblągu. Museum of 1990s Video Games in Elbląg  |
| Podlaskie           | a. Sokólskie Muzeum Gier Retromania (Sokółka Museum of Games Retromania)  |
| Wielkopolskie       | a. ATARI Muzeum in Poznań<br>b. Centrum Szyfrów Enigma w Poznaniu (Enigma Cipher Centre in Poznań)  |

\*The locations of the places listed here are shown on static and dynamic maps entitled 'Towards a Digital Cultural Heritage Trail in Poland'. The list and map were created under the Mapping Digital Cultural Heritage Museums in Poland (DigiMap) project under REI project No. K/658/2024/WRE. The map is an original work by the author published at DigitalHeritage.pl (<http://digitalheritage.pl/2024/04/18/szlak-dziedzictwa-cyfrowego/>) (published: 18.04.2024, revision: 10.08.2024). DigitalHeritage.pl is a proprietary website of the author.

\*\*The square is not a museum. It 'commemorates a company whose computers blazed the IT trail in Poland in the second half of the twentieth century' (elwrowcy.pl).

\*\*\*The museum is being reorganised and moved (as on 10.08.2024).

Source: original work.

Kraków is the most densely populated with museums of digital cultural heritage. Four unique museums with interactive exhibitions of digital cultural heritage are situated relatively close to each other there (downtown Kraków and close to the city centre). Moreover, Katowice, with its Museum of the History of Computers and IT, is not very far from Kraków, a must-see according to retro-IT enthusiasts.

Northern Poland has slightly fewer and more apart museums of digital cultural heritage. Kraków is a great starting point for the 'Tourist Trail of Digital Cultural Heritage in Poland' because of the reputation of its museums, which not only are interactive but also offer an extensive exhibition of various types of hardware, including consumer electronics, not just video game consoles or computers. Note that some of the places on the map are university exhibitions. What is more, some exhibitions are temporary. It is very relevant to visitors' plans.

Museum mapping revealed a potential market niche. The static and interactive maps have been published on the author's website DigitalHeritage.pl. No mention of museums of digital cultural heritage in Świętokrzyskie, Lubelskie, and Podkarpackie Voivodeship, that is south-eastern Poland, or Lubuskie and Wielkopolskie Voivodeships was found in publications or media reports (as on 10.08.2024). Lack of competition may encourage entrepreneurs to open a similar museum in these voivodeships.

#### **4.2. Results of the pilot survey**

The respondents approached the questions in various ways. Some answers were excessively economical, while others were extensive. Despite the relatively small sample, the survey revealed some novel suggestions of use to curators of digital cultural heritage museums. The structured interviews with the curators shed light on the problems of private museums of digital cultural heritage in Poland. Note that the survey questions were mostly open-ended because the research is based on qualitative, structured interviews, not the quantitative approach.

Seven representatives of Gen Z were interviewed (aged 19-26). Of those visitors to the Museum of Electronics in Kraków who agreed to participate in the study, six were women and one was a man. All of them were first-time visitors to the museum and highly enjoyed their first impressions. Four of them assessed their impressions as good (score 4 out of 5) and three as very good (enthusiastic perception). All the participants found the large number of items and their diversity, combined with interactions with the exhibits and stories told by the curators, to be the most impressive. They were very interested in retrogames, which they believed offered 'an opportunity to go back in time', 'a return to one's childhood', and 'associations with childhood'. Highly interesting exhibits included vacuum-tube radios and telephones. For two respondents, it was the first time they came across 'computers in the form of a keyboard' (such as the Atari) and pinball machines. However, museum visitors come with various expectations. For example, two of the respondents hoped for more insight into everyday objects rather than computer games.

What the respondents imagined would be in the Museum of Electronics differed from what they experienced. One of the respondents shared their story: 'Before I came here, I imagined a small museum with nothing to write home about, where you mainly listen to a guide. The reality was completely different.' The respondents were not expecting 'hands-on' exhibits and a 'casual, homely atmosphere'. One respondent found a passionate curator particularly engaging. The interviews revealed that the respondents were interested in the workings of the antique objects, the mechanisms, designs, and technical details. The respondents unanimously agreed that the visit expanded their awareness of digital cultural heritage, particularly regarding the pace of technological development: 'Thanks to the visit, I now know how big the technological leap was over a short time'.

As evident from the study visits, the central theme of private museums housing digital cultural heritage artefacts is mostly video and computer games, arcade games, and/or pinball machines. It is only natural because retrogaming particularly effectively appeals to the imagination of potential visitors, especially young people. However, the interviews show that the respondents were more interested in archaic radio receivers, TVs, telephones, and electronics than in computer games or gaming consoles. The respondents were particularly interested in Polish UNITRA radio receivers, Vela TVs, or the Polish Alfa K2 vacuum cleaner manufactured until the mid-1970s. This is not to say that archaic gaming equipment failed to arouse interest. Quite the contrary, but the observations suggest that it is relatively well-known. Visitors to the museum focused more on objects with which they were less familiar, and that were not as common in popular culture as computers or consoles. It is, in a way, a suggestion for museum curators. Apart from well-known devices like the Atari or Commodore, interactive exhibitions can also display objects and décor typical of the times, including original small everyday objects, such as a desk lamp, floppy disk boxes, or era-specific computer magazines. One such exhibition can be found at the Museum of the History of Computers and IT in Katowice. Opinions of the visitors to the Museum of Electronics in Kraków confirmed that it is reasonable to offer detailed, holistic exhibitions that reflect the spirit of the age.

Owners of private museums displaying digital equipment, including computers, video game consoles, radios, and other electronics, often show no interest in meeting the formal criteria set in the Act necessary to become an ‘official museum’. In the words of the owners of the Museum of Electronics in Kraków: ‘We do not aspire to become a museum in the strict sense even considering potential state subsidies. It could deprive us of our independence and decision-making capabilities as museum curators and business people. The extensive official supervision over museums in Poland also puts us off.’ Their concerns focus on independence: ‘We fear we could no longer exercise full control over the exhibition and items we display if we became a state museum.’ Therefore, the modest number of digital cultural heritage facilities listed by the ministry could be caused by legal and bureaucratic requirements that the owners believe could restrict their freedom to shape their museum and economic operations. They would rather be ‘entrepreneurs involved in the protection of digital cultural heritage’ than ‘museologists involved in the protection of digital cultural heritage’. In addition, owners of private museums of digital cultural heritage pointed out the debasement of the notion of the museum in the Polish public sphere. They believe it is because many businesses now use the word ‘museum’ in the name of their commercial operations. The ‘cultural heritage’ trend is on the rise and used for marketing purposes in this case. Such organisations are generally not involved in conservation, exhibitions, or museum operations. Instead, they focus on profits. Note here that it is a common global malpractice to use the word ‘museum’ in the name of a commercial venue where visitors can use digital hardware. Only two out of the 33 digital cultural heritage places identified online refrained from using the word ‘museum’ in their names. This suggests that it is a common approach not frowned upon in the world of retrocomputing and retrogaming.

The curators revealed their plans for business growth during the interview. Their extensive collection of digital hardware, increasing public interest in digital cultural heritage artefacts, especially among pupils, and the untapped market in Silesian voivodeship encouraged them to open a new museum in Chorzów. This means that despite certain difficulties, Poland offers perspectives for the growth of private museums of digital cultural heritage founded on retrogaming and retrocomputing.

## 5. Discussion

### 5.1. Digital cultural heritage in local and central government strategies

Digital cultural heritage emerges from technological development, which affects changes in consumer behaviour, market fluctuations, and cultural transformations connected with how people communicate, establish relationships or form communities. Socioeconomic development, in its broadest meaning, should be founded on civilizational achievements and historical knowledge rather than reject them. It is consistent with the notion of harmonious, sustainable development through evolution instead of revolution (United Nations, 1993). Research shows that cultural heritage is gaining more ground and attention in strategic documents. They cover tangible, intangible, and natural heritage extensively, but not digital cultural heritage (Knapik, Król, 2023). Nonetheless, digital cultural heritage should have a chance to appear in regional development strategies just as such ‘classical forms of cultural heritage’ as religious objects, dishes, handicrafts, and folk traditions and customs (Król et al., 2019). Just like tangible and intangible heritage, digital cultural heritage has museums and devotees who collect, restore, and promote exhibits: hardware and software. It has grassroots initiatives and communities focusing on preserving and promoting cultural heritage. The fast pace of technological development is also a salient factor here because ‘30 years in the digital ecosystem is like 300 years in construction and architecture’. Rural digital cultural heritage is investigated in Poland as a less-known part of heritage. One of its embodiments is the online promotion of agritourism (Król, Zdonek, 2023).

Digital cultural heritage has a relatively considerable tourist potential for image and brand building and improving regional economic development (Król, 2021). There are many places in Poland and abroad where people strive to preserve and promote the heritage of hardware and software. They provide educational services as well. Consider, for instance, the mission statement of Replay Museum (US): ‘Replay Museum promotes the art, science and cultural significance of mechanical amusement machines to preserve these historical artifacts for future generations’ (Replay Museum, 2023). Therefore both the institutions and digital cultural

heritage itself should be included in strategic documents. If it is disregarded, posterity can be deprived of a unique piece of history of technology and culture.

## **5.2. Perception of digital heritage in Poland**

The author noted that digital cultural heritage is mostly associated with computer – or more generally – video games, and ‘old computers’ in Poland. Therefore, the public should be educated on what digital cultural heritage is. It covers rich and diversified collections of such digital devices as radios but also software and digital files, including websites, digital content, books, audio and video materials, and graphics both born digital and digitalised. Digital heritage encompasses also tools, design techniques, and styles typical of specific periods.

Digital cultural heritage is not just hardware, software, and digital files. It is also socioeconomic events, such as the dot-com bubble, a sudden skyrocketing of stock of new (Internet) technology companies in 2000 and 2001 (Gaither, Chmielewski, 2006). The dot-com bubble burst significantly influenced the society and economy and is still analysed today (DeLong, Magin, 2006). Another prominent example is the digital heritage of radio broadcasting. Broadcast ‘The War of the Worlds’, based on a novel by Herbert G. Wells, was performed live at The Mercury Theatre on the Air. It was broadcast by an American radio station, Columbia Broadcasting System (CBS), on Sunday, 30 October 1938. Many people believed what they heard on the radio. It was a factoid, a piece of information considered true and accurate only because it is provided by mass media. The ‘War of the Worlds’ is one of the better-known if slightly exaggerated episodes in the colourful history of mass media. This event demonstrated how mass media can create theatrical illusions and manipulate the public (Hayes, Battles, 2011).

## **5.3. (Para-)museums of digital heritage in Poland**

Most of the places that store digital cultural heritage artefacts are not museums according to the legal definition (Act, 1996). They are neither in the State Register of Museums nor on the Ministry’s list of museums. They, nevertheless, work as if they were museums; they acquire antique hardware, repair it accordingly, run it, and display it for visitors to experience. These people often promote their efforts at special and educational events. The places are run mostly or exclusively by enthusiasts as grassroots projects. The initiatives come from private individuals or associations/foundations. On the one hand, the word ‘museum’ as used in the Act (1996) in the name of such institution adds gravity, but on the other hand, it often causes controversy, especially among museologists. They point out that entities that ‘claim to be museums’ are not museums as defined in the Act (1996) and thus are not required to conform to the Act. Therefore, it might be more accurate to refer to these places as ‘digital cultural heritage institutions; ‘digital cultural heritage entities’, or para-museum institutions (institutions related to museums).



The prefix ‘para-’ derives from Ancient Greek παρά (pará, ‘beside; next to, near, from; against, contrary to’) and can redefine the word that it precedes either from a temporal, spatial, or causal perspective. According to Nora Sternfeld (2018), a para-museum is a subversive gesture that steals (the power of definition and the infrastructure) from the museum. Regarding digital cultural heritage, the prefix ‘para-’ describes a new quality created by grassroots activists, enthusiasts, communities of ‘nerds’, and culture creators in a (para-)museal space.

Formally, and according to the classification by the International Council of Museums (ICOM) recommended by UNESCO, the term ‘para-museum institution’ covers zoological and botanical gardens, nature reserves, historical monuments as well as other institutions, including planetariums, science and engineering villages and centres, and permanent exhibitions that are not museums but display achievements, discoveries, and trivia from history, archaeology, culture, nature, and engineering. According to Statistics Poland (2023) and the ICOM’s definition (2022), para-museum institutions conduct museum-type activities but not under a statute or rules approved by a minister for culture and protection of national heritage. Para-museum is a non-museum, a non-profit organisation, the purpose of which is to provide permanent protection to cultural, scientific, and natural assets. It is considered museal in nature. Para-museum institutions, just like other cultural entities, provide education in the form of educational events, lessons at museums, and workshops, but also competitions, seminars, symposiums, and conferences. They are not as engaged in publishing (Statistics Poland, 2023). ‘Para-museums’ are also referred to as ‘museal institutions’. ‘By museal institutions, we mean non-profit establishments, museums, exhibition and interpretation centres which, besides the functions of acquisition, conservation, research, and management of collections that some may carry out, have in common that they are places of education and dissemination dedicated to the arts, history, and the sciences.’ (Observatoire de la culture et des communautés du Québec, 2004; Desvallées, Mairesse, 2010).

According to Statistics Poland (2023), the largest number of exhibits and live species were in Małopolskie Voivodeship: 2.7 million (57.4%). In 2022, there were 349 para-museum institutions registered in Poland (19 zoological gardens, 38 botanical gardens, and 292 other institutions), 65.3% of which were public and 34.7% privately owned. Para-museum institutions were visited by 18.6 million people in 2022, including 15.5 million in public places and 3.1 million in private establishments. Hence, their role in the protection of cultural heritage is significant. Furthermore, the data show that para-museums seem to be a natural phenomenon. Today, contributions from local communities, volunteers, collectors, enthusiasts, associations of ‘friends of museums’, and sponsors to the museum effort grow ever more pronounced. This involvement shifts museums towards more social institutions integrated into a network of family, religious, or educational institutions, as pointed out by Peter van Mensch (1992). This mechanism is evident in the Museum of Engineering and Technology in Kraków, where new family zones are opened to the public from time to time, such as the ‘building blocks zone’ or ‘experimental garden’.

#### 5.4. Temporary exhibitions, grassroots efforts, and university projects

Some digital cultural heritage museums are free of charge static exhibitions. Visitors may not operate the exhibits. Such places require no tickets and provide no interactive experience. This approach is typical of university museums and exhibitions. Some of them are the Institute Virtual Museum of Computers of the Wrocław University of Technology or the IT Museum of the Nicolaus Copernicus University in Toruń. Although usually kept in display cases, the items are sometimes taken out for special occasions to promote science and culture or during thematic events, such as the Science and Art Fest or Researchers' Night. According to data found online (www1), 'the exhibits at the IT Museum of the Nicolaus Copernicus University in Toruń usually date back to 1980-2000. The exhibition includes such items as personal computers, mobile computers, servers and network hardware, printers, copiers, terminals, calculators, components, and computer accessories.'

University exhibitions are most often displayed in display cases in halls of individual departments or institutes. 'History of Computers', for example, has been showing items from the Wrocław University of Technology's Computing Centre in display cases since 2000. It was one of the displays linked to an event promoting science and culture, a Science Fest. Components of ELWRO's Odra and RIAD are on show in two cases. Consecutive display cases contain storage media, 8-bit computers, such as the Spectrum, Commodore, Atari, Sony, Meritum, Macintosh, IBM, and others, and personal computer components, such storage, processors, disks, or modems. The Institute Virtual Museum of Computers of the Wrocław University of Technology offers an online list of computers and an image gallery (www2).

Many digital cultural heritage museums are grassroots initiatives driven by enthusiasts. A grassroots project to record the history of the Polish Elwro 800 Junior had been active online until recently (discontinued website: [elwro800junior.pl](http://elwro800junior.pl); now copies available in the Internet Archive). The Elwro 800 Junior was designed for school laboratories. The Elwro 804 Junior was a home-use personal microcomputer for work, learning, and entertainment (Maćkowiak et al., 2018). After many years, the founders of [elwro800junior.pl](http://elwro800junior.pl) moved all the content to the 'Polskie komputery' (Polish computers) website (<https://polskiekomputery.pl>, accessed 10.08.2024). 'Polskie komputery' is based on a private collection of artefacts linked to the history of Polish computer engineering. It was initiated in 2016 by a Polish programmer Marcin Robert Kaźmierczak. The Museum of Games and Computers of the Past, just like many other similar places, was also established by enthusiasts. In this particular case, the founders already had experience with a previous project RetroGralnia.

Apart from stationary exhibitions, museums of digital cultural heritage are often active in digital media and offer education (learning courses, lectures, training), exhibitions, and commemoration projects. It is through such effort that digital cultural heritage can reach a broader audience. For instance, the Community Committee for the Commemoration of Zakłady Elektroniczne Mera-Elwro in Wrocław started a group of activists known as

‘Elwrowcy’. One of their achievements is a website at <http://elwrowcy.pl> (accessed 10.08.2024) with documents, publications, photographs, information, and data on the history of ELWRO accompanied by documents and photographs recording the effort to commemorate ELWRO (the square and obelisk).

### **5.5. Unsuccessful attempts to preserve digital cultural heritage**

Not all efforts to preserve digital cultural heritage are successful. The most common obstacles are hardware, organizational, and financial problems, but also an unwelcoming attitude of culture and cultural heritage experts. Some experts voice contemptuous opinions about private museums of digital cultural heritage, belittling them as ‘small commercial establishments that collect old games and gadgets’ or ‘commercial, private institutions that offer people old computer games and electromechanical game machines under the pretence of a museum’. In contrast, the museums on the trail of digital cultural heritage in Poland are or aspire to be among the largest in Europe. Many of them are unique.

Not all attempts to restore digital cultural heritage artefacts are successful. First, it is not always possible to repair antique hardware, which is often in poor condition to start with. It may turn out to be too expensive to repair damaged arcade games to expect any payback, for example. Second, it may be hard to find a permanent hosting site, as in the case of the Museum of Personal Computers (Muzeum Komputerów Osobistych) in Łódź, for example (as on 10.08.2024). Shortage of original parts and their growing prices do not make things easier, aided by increasing costs of electricity and business operations in Poland. These circumstances often force private museums to seek sponsors or patrons. When problems accumulate, the museum can be shut down or moved online, like the Museum of the History of Processors and IT (Muzeum Historii Procesorów i Informatyki).

Archived pages of the Museum of the History of Processors and IT in the Internet Archive read, ‘The Museum of the History of Processors and IT is the virtual image of a private collection held by an enthusiast from Kraków.’ But it used to be more than just a virtual collection. Collection items were shown during thematic events, such as the EDU Opole Education Show in 2015 (including a demonstration of a mobile laboratory with a microscope and microprocessors on various production stages). The archived information suggests that the museum was open in 2014 and 2015, and the founders intended to ‘move the collection to the real world’, which is consistent with the growing number of ‘field exhibitions’. The archive further holds an extensive ‘catalogue of microprocessors’ kept at the museum. The website was last updated on 11 September 2015. The reason for its discontinuation is unknown. Archived copies of the pages can be found in the Internet Archive ([www3](http://www3)).

## 5.6. Digital cultural heritage museums in the world

Digital cultural heritage museums focus on recording the history of computer development, hardware, and software in many countries, such as the US, Germany, Russia, Czechia, United Kingdom, Spain, Croatia, and Austria. Computerspielemuseum in Berlin was established in 1997 and has over 350 various consoles and computer systems. It is a co-founder and member of the European Federation of Game Archives, Museums, and Preservation Projects, as well as a member of ICOM and the German Museums Association. Moreover, to improve the conditions for the collection, indexing, and preservation of computer games, Computerspielemuseum is a regular initiator and partner of scientific projects and is involved in various initiatives and projects that aim to develop strategies for the preservation of digital artefacts. The PEEK&POKE Computer Museum was opened in 2007 as an educational non-profit programme at the initiative of several enthusiasts of retrocomputers. Today, the museum hosts over 1000 global items on about 300 m<sup>2</sup>. The National Museum of Computing in Bletchley boasts the largest European collection of operational archaic computers, the world's oldest original and operational digital computer (Harwell Dekatron or WITCH), and a reconstructed Colossus. The museum mainly acquires computers and IT systems devised in the United Kingdom. Flippermúzeum – The Budapest Pinball Museum has displayed pinball machines manufactured from the late nineteenth century along with the latest offers since 2013. The International Arcade Museum (IAM) of the Museum of the Game (Pasadena, US) is the world's largest museum of the art, inventions, and history of the videogame, amusement, and coin-operated machine industries. Its coverage includes video games, pinball, slot machines, mechanical and electromechanical arcade games, vending machines, trade stimulators, and all other coin-operated devices. What is important, the IAM provides content and community services related to these machines. It also protects, researches, and disseminates thematic knowledge and cutting-edge educational research. To that end, it has compiled one of the world's leading archives covering the art, entrepreneurs, inventions, and history of the amusement and coin-operated machine industries (IAM, 2023). The Museum of Soviet Arcade Machines in Moscow and Saint-Petersburg (Russia) is a private museum with interactive exhibits. The museum represents the world's largest playable collection of unique arcade games produced in the USSR from the 1970s to the 1990s. As the curators put it, 'arcade machines are a big symbol of the Soviet Era. From the mid-1970s to the 1990s, arcade machines were a primary source of entertainment for the Soviet population. Along with special gaming halls, machines could be found in parks, cinemas, hotels and in young pioneer camps – places for children's vacations during the summer and winter holidays, a widespread phenomenon in socialist countries. By playing arcade machines, we not only entertain ourselves but also look into the past. We can learn how the machines were produced and better understand Soviet industrial design, technology, and engineering achievements' (RU, 2023). The museum holds about 130 machines on nearly 400 m<sup>2</sup>.

## 6. Summary

To the best of the author's knowledge, the list and map with the locations of digital cultural heritage museums in Poland are a comprehensive source of information about – probably – all such institutions in Poland (as on 10.08.2024). The recorded places constitute the ‘Tourist Trail of Digital Cultural Heritage in Poland’. The author believes that just like tourists are offered wooden architecture routes, trails of wooden churches, or culinary trails, they should be able to follow a digital cultural heritage trail. The trail should reach beyond museums of games and computers. It should include places where the history of Polish computer design is commemorated, like ELWRO Square in Wrocław. The list and the map are a foundation for future work to build an even more comprehensive list of places on the ‘Tourist Trail of Digital Cultural Heritage in Poland’.

Institutions that exhibit digital cultural heritage artefacts but fail or do not intend to meet the formal criteria to be official museums build their brands on retrogaming and interaction with antique hardware. They are usually businesses with business names containing the word ‘museum’ that collect admission fees from individuals and groups and hold special events or lessons in museums. This approach gives them a certain degree of freedom and independence from statutory requirements for museums under the Act. This does not change the fact that these places carry out functions similar or identical to those of registered museums; they collect artefacts, for example, although they do not always catalogue them or compile scientific documentation. Such places also store assets under conditions to maintain their proper repair and safety, preserve and conserve collections, hold permanent and temporary exhibitions, engage in artistic and cultural activities, share their collections for educational and scientific purposes, and finally provide adequate conditions for tourism and access to the collections and information they hold. All this is also in the interest of the owners because they are entrepreneurs in addition to being enthusiasts. Running a museum of digital cultural heritage with faulty or damaged computer equipment is impossible. Note that the retrogaming community is very discerning and specialised. There is not much room for cutting corners with retrocomputer exhibitions. Therefore, to secure business success, institutions make special efforts to keep the artefacts they offer to visitors operational and diversified, as this affects their image and promotion. Their lives as enterprises depend on the number of tickets sold and held special events.

The primary content of digital cultural heritage museums on the ‘Tourist Trail of Digital Cultural Heritage in Poland’ is computer games, consoles, game machines, and the act of playing games. Still, not all the audience are interested in retrogaming and retrocomputing. Some are passionate about the history of everyday objects. They would prefer exhibitions in electronics, technology, and engineering museums containing antique consoles and computers, automotive artefacts, household equipment, and industrial machinery.

## 6.1. Practical implications and future research

The list and map of the museums of digital cultural heritage are the foundation for the ‘Tourist Trail of Digital Cultural Heritage in Poland’. The purpose of a tourist trail is to show places that the organizing institution considers unique, worth seeing, and worth preserving for posterity.

The ‘Tourist Trail of Digital Cultural Heritage in Poland’ concept is founded on linking several dozen unique museums in Poland. The initial version proposed here includes 33 places to see. Many of them focus on retrogaming and retrocomputing, complemented by insights into Polish technical and engineering achievements and associated socioeconomic phenomena. Further work on the trail should be directed towards the identification of places and infrastructure, including buildings and structures, squares and monuments, linked to the history of computerization in Poland. They should also be part of the trail. After the list is complete, it will be necessary to design signs and boards in various languages with short descriptions of the place/object and practical guidelines for tourists. Creating a website and an interactive map of the trail is also advisable.

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## References

1. Act of 21 November 1996 on museums Polish Journal of Laws of 2022 item 385 [Ustawa z dnia 21 listopada 1996 r. o muzeach, Dz.U. 1997 nr 5 poz. 24, z późn. zm.]. Retrieved from: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=wdu19970050024>, 20.08.2024.
2. DeLong, J.B., Magin, K. (2006). *A short note on the size of the dot-com bubble*. National Bureau of Economic Research. Retrieved from: <https://www.nber.org/papers/w12011>, 20.08.2024.
3. Desvallées, A., Mairesse, F. (Eds.) (2010). *Key Concepts of Museology*. Armand Colin. Retrieved from: <https://icofom.mini.icom.museum/publications/key-concepts-of-museology/>, 20.08.2024.

4. Gaither, Ch., Chmielewski, D.C. (2006). Fears of Dot-Com Crash. Version 2.0. *Los Angeles Times*. Retrieved from: <https://www.latimes.com/archives/la-xpm-2006-jul-16-fi-overheat16-story.html>, 20.08.2024.
5. Galloway, P. (2011). Retrocomputing, archival research, and digital heritage preservation: A computer museum and iSchool collaboration. *Library Trends*, Vol. 59, No. 4, pp. 623-636, doi: <https://doi.org/10.1353/lib.2011.0014>
6. Górka, A. (2011). Krajobraz kulturowy wsi jako nośnik mitu. *Prace Komisji Krajobrazu Kulturowego*, No. 15, pp. 248-259.
7. Hayes, J.E., Battles, K. (2011). Exchange and interconnection in US network radio: A reinterpretation of the 1938 War of the Worlds broadcast. *Radio Journal: International Studies in Broadcast & Audio Media*, Vol. 9, No. 1, pp. 51-62.
8. IAM (2023). *The International Arcade Museum. Museum of the Game*. Retrieved from: <https://www.arcade-museum.com/aboutus.php>, 20.08.2024.
9. ICOM (2022). *Museum Definition. International Council of Museums*. Retrieved from: <https://icom.museum/en/resources/standards-guidelines/museum-definition/>, 20.08.2024
10. Karp, C. (2014). Digital heritage in digital museums. *Museum International*, Vol. 66, No. 1-4, pp. 157-162, doi: <https://doi.org/10.1111/muse.12069>
11. Knapik, W., Król, K. (2023). Inclusion of Vanishing Cultural Heritage in a Sustainable Rural Development Strategy – Prospects, Opportunities, Recommendations. *Sustainability*, Vol. 15, No. 4, 3656. doi: <https://doi.org/10.3390/su15043656>
12. Kozuchowski, K. (2005). *Walory przyrodnicze w turystyce i rekreacji*. Poznań: Kurpisz S.A.
13. Król, K. (2021). Hardware Heritage – Briefcase-Sized Computers. *Heritage*, Vol. 4, No. 3, pp. 2237-2252, doi: <https://doi.org/10.3390/heritage4030126>
14. Król, K. (2024). *Szlak cyfrowego dziedzictwa kulturowego [Towards a Digital Cultural Heritage Trail in Poland]*. Retrieved from: <http://digitalheritage.pl/2024/04/18/szlak-dziedzictwa-cyfrowego/>, 20.08.2024.
15. Król, K., Hernik, J. (2022). Digital Folklore of Rural Tourism in Poland. *Sustainability*, Vol. 14, No. 3, 1165, doi: <https://doi.org/10.3390/su14031165>
16. Król, K., Kao, R., Hernik, J. (2019). The Scarecrow as an Indicator of Changes in the Cultural Heritage of Rural Poland. *Sustainability*, Vol. 11, No. 23, 6857, doi: <https://doi.org/10.3390/su11236857>
17. Król, K., Zdonek, D. (2023). Promoting Agritourism in Poland with Ready-Made Digital Components and Rustic Cyberfolklore. *Big Data Cogn. Comput.*, Vol. 7, No. 1, 23, doi: <https://doi.org/10.3390/bdcc7010023>
18. Król, K.; Zdonek, D. (2024). Digital artefacts of rural tourism: the case study of Poland. *Global Knowledge, Memory and Communication*, Vol. 73, No. 3, pp. 258-273, doi: <https://doi.org/10.1108/GKMC-03-2022-0052>

19. Leszczycki, S. (1977). *Geografia a planowanie przestrzenne i ochrona środowiska*. Warszawa: PWN.
20. Logan, W.S. (2007). Closing Pandora's Box: Human Rights Conundrums in Cultural Heritage Protection. In: H. Silverman, D.F. Ruggles (Eds.), *Cultural, Heritage and Human Rights* (pp. 33-52). New York: Springer, doi: [https://doi.org/10.1007/978-0-387-71313-7\\_2](https://doi.org/10.1007/978-0-387-71313-7_2)
21. Maćkowiak, B., Myszkiel, A., Safader, B. (2018). Polskie komputery rodziły się w ELWRO we Wrocławiu. In: G. Trzaskowska (ed.), *Rola Wrocławskich Zakładów Elektronicznych ELWRO w rozwoju informatyki w Polsce*. Wrocław.
22. Nitkiewicz-Jankowska, A., Jankowski, G. (2010). Krajobraz kulturowy jako walor turystyczny. *Prace Komisji Krajobrazu Kulturowego, No. 14*, pp. 185-193.
23. Observatoire de la culture et des communautés du Québec (2004). *Système de classification des activités de la culture et des Communications du Québec*. Retrieved from: <http://www.stat.gouv.qc.ca/observatoire/scaccq/principale.htm>, 20.08.2024.
24. Panelli, R., Tipa, G. (2007). Placing Well-Being: A Maori Case Study of Cultural and Environmental Specificity. *EcoHealth, No. 4*, pp. 445-460.
25. Pawlikowski, S. (1959). Postępy wiedzy technicznej a ochrona zabytków kultury. *Ochrona Zabytków, No. 2*, pp. 82-87.
26. Pstrocka-Rak, M., Rak, G. (2021). Ochrona i udostępnianie kulturowego dziedzictwa informatycznego z perspektywy Muzeum Historii Komputerów i Informatyki w Katowicach. *Muzealnictwo, No. 62*, pp. 161-170.
27. Rak, G., Pstrocka-Rak, M. (2023). Instytucjonalna ochrona dziedzictwa informatycznego oraz jego udostępnianie w polskich muzeach [Institutional preservation of information technology heritage and making it available in Polish museums]. *Turystyka Kulturowa, Vol. 4, No. 129*, pp. 7-32.
28. Replay Museum (2023). *Replay Amusement Museum. Mission Statement*. Retrieved from: <https://www.replaymuseum.com>, 20.08.2024.
29. Retro (2024). *Nowe Muzeum w Łodzi – WGrasie – prapremiera?* RetroGralnia & Fundacja GIKME. Retrieved from: <https://retrogralnia.pl/nowe-muzeum-w-lodzi-wgrasie-prapremiera/>, 20.08.2024.
30. RU (2023). *Museum of Soviet Arcade Machines in Moscow and Saint-Petersburg*. Retrieved from: <https://15kop.ru>, 20.08.2024.
31. Statistics Poland (2023). *Culture and national heritage in 2022 [Kultura i dziedzictwo narodowe w 2022 r.]*. Statistics Poland, Social Surveys and Labour Market Department. Warszawa/Kraków: Główny Urząd Statystyczny.
32. Sternfeld, N. (2018). *Das Radikaldemokratische Museum*. De Gruyter.
33. Thwaites, H. (2013). Digital Heritage: What Happens When We Digitize Everything? In: E. Ch'ng, V. Gaffney, H. Chapman (Eds.), *Visual Heritage in the Digital Age*. London: Springer Series on Cultural Computing.



34. UNESCO (1972). UNESCO Institute for Statistics, 2009 UNESCO Framework for Cultural Statistics and UNESCO, Convention Concerning the Protection of the World Cultural and Natural Heritage. Retrieved from: <https://uis.unesco.org/en/glossary-term/natural-heritage>, 20.08.2024.
35. UNESCO (2003). *Text of the Convention for the Safeguarding of the Intangible Cultural Heritage*. Retrieved from: <https://ich.unesco.org/en/convention>, 20.08.2024.
36. UNESCO (2009). *Charter on the Preservation of the Digital Heritage*. Retrieved from: <https://unesdoc.unesco.org/ark:/48223/pf0000179529.page=2>, 20.08.2024.
37. United Nations (1993). *World commission on culture and development. General Conference, Twenty-seventh Session, Information Document, Item 5.5 Provisional Agenda*. Paris: UNESCO.
38. van Mensch, P. (1992). *Towards a methodology of museology (PhD thesis)*. University of Zagreb. Retrieved from: <http://emuzeum.cz/admin/files/Peter-van-Mensch-disertace.pdf>, 20.08.2024.
39. www1. *Informacje o Muzeum Informatyki*. Uniwersytet Mikołaja Kopernika w Toruniu [Museum of IT in Toruń]. Retrieved from: <https://www.mat.umk.pl/web/wmii/muzeum-informatyki>, 20.08.2024.
40. www2. *Wirtualne Instytutowe Muzeum Komputerów*. Wykaz komputerów [Institute Virtual Museum of Computers of the Wrocław University of Technology. List of Computers]. Retrieved from: <https://www.ii.pwr.edu.pl/pl/instytut-i-32/wirtualne-muzeum-komputerow/wykaz-komputerow/>, 20.08.2024.
41. www3. *Muzeum Historii Procesorów* [Processor Museum]. Internet Archive. Retrieved from: <https://web.archive.org/web/20160304190946/http://muzeumprocesorow.pl/>, 20.08.2024.
42. Wykaz MKiDN (2024). *Wykaz muzeów działających w oparciu o statut bądź regulamin uzgodniony z ministrem właściwym do spraw kultury i dziedzictwa narodowego*. Ministerstwo Kultury i Dziedzictwa Narodowego. Retrieved from: <https://bip.mkidn.gov.pl/pages/rejestry-ewidencje-archiwa-wykazy/wykaz-muzeow.php>, 20.08.2024.



## HUMAN CAPITAL MANAGEMENT ON THE EXAMPLE OF SELECTED HEALTHCARE FACILITIES

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**Purpose:** Human resources in service organizations constitute the fifth crucial element of the marketing mix. This is also true in healthcare facilities, where medical services fundamentally rely on people. It is primarily these people that the client/patient seeks. Therefore, managing human capital in these facilities is a noteworthy element. The aim of this article is to examine the human resource management process and the related problems in selected healthcare facilities in the Silesian Voivodeship. This study is a pilot study, highlighting gaps and research issues in this thematic area.

**Design/methodology/approach:** The study was based on targeted research. Custom-designed survey questionnaires were sent to healthcare facilities with a request for voluntary participation. The thematic scope was presented. The research tool was a custom-designed survey questionnaire. Contact with the facility was made through direct contacts with persons responsible for human resources in the facility. The study lasted from June 2 to July 4, 2024, and included employees from three healthcare facilities. Responses were obtained from several participants.

**Findings:** The study can serve as a small contribution to creating the foundation for developing guidelines for healthcare facilities concerning human capital management. The study identified problematic areas and aspects of human capital management that require special attention. Additionally, it highlighted organizational elements of the facilities that are highly valued by employees.

**Research limitations/implications:** This study should be expanded to include a significantly larger number of healthcare facilities, potentially covering all of Poland. This is due to the specific nature of healthcare systems and recruitment processes. However, the results concerning Poland could be compared with solutions from other European countries. Such an approach could help managers and employees understand the human capital management process not only at the recruitment stage but also at other stages of management. The main problem of the study was the relatively short data collection period and the weak response from entities and employees who could be included in the study.

**Practical implications:** Help for managers.

**Social implications:** Better management of healthcare facilities and their personnel leads to improved healthcare accessibility and thus to the overall health improvement of the population. A well-managed healthcare facility with well-conducted internal marketing can enhance job satisfaction, increase employee engagement, and improve the quality of customer/patient service.

**Originality/value:** This study can help managers understand the necessity of properly implementing internal marketing and managing personnel effectively. There is relatively little literature specifically addressing this issue in Poland in recent years, especially in connection with internal facility marketing.

**Keywords:** Healthcare facilities, management, human capital, medical personnel.

**Category of the paper:** Research paper, case study.

## Introduction

In its essence as a service, a medical service inherently includes a strong element associated with the fifth element of the marketing mix—people. This aspect is emphasized by many authors, including Kotler (Kotler, 2002, 2010, 2013), who highlights the crucial role of people/personnel in creating the quality of the service, particularly in healthcare services. Dobski (Dobska, M, Dobski, P., 2000) points out the key role of personnel in creating the service and implementing a marketing communication model in healthcare facilities. Therefore, managing personnel is a crucial aspect of creating the value of medical services. Many researchers, including Janowska (Janowska, 2010) and Romanowska (Romanowska, 2011), address issues related to human resource management. The behavior and actions of healthcare service providers directly affect patients' perceptions of the service. Therefore, the following presents the main types of healthcare facility employees. These are conventional categories intended to outline the general principles of employee conduct and working styles. All medical facility employees can be roughly divided into four categories based on the type of services they provide:

- Type 1. Nurse – sells personal engagement, provides relatively common services that do not require many innovations but do require emotional involvement; it is not so much about the skill of preparing medication as it is about giving advice or guidance to the patient, who expects care and comfort, and maintaining contact throughout the duration of the problem.
- Type 2. Pharmacist – sells ready-made products, conducts activities where the patient buys a strictly defined service without expecting advice or closer contact; the service is to be performed according to high quality standards and at the lowest possible price.
- Type 3. Psychotherapist – primarily sells their time, experience, and personal engagement; the patient expects a thorough explanation of the causes and effects of their condition and ways to solve problems; the therapist must not only diagnose but also apply treatment.

- Type 4. Neurosurgeon – sells unique, top-tier knowledge; performs unique actions in critical situations; this type of activity combines a high degree of specialization, creativity, and innovation with limited patient contact, who does not need to know the details but expects the right solution, willing to pay any price for it (Kapliński, Łysiak, Pięcińska, 2001).

This classification helps understand the challenges faced by each type of employee and what is expected of them.

**Table 1.**

*Matrix of Benefits Obtained by the Patient According to the Status of the Personnel Providing a Specific Type of Medical Services*

| Scope of contacts with the patient   | Standard activity with focus on solution   | Individualised activities with emphasis on diagnosis  |
|--|--|---|
| High level of contact with the patient, counselling and personal contact is important                                  | Nurse:<br>- standardised services,<br>- personalised services,<br>- need for care, comfort               | Psychotherapist:<br>- personal services,<br>- active, participatory,<br>- need for clarification of diagnosis,<br>- presentation of the treatment process |
| Low level of contact with the patient:<br>- professionalism counts and execution,<br>- patient focuses only on results | Pharmacist:<br>- standardised services,<br>- mass,<br>- high quality standard,<br>- desirable low prices | Neurosurgeon:<br>- specialised services highly innovative,<br>- asymmetry of information,<br>- reliability desirable                                      |
| Range of patient needs and benefits  | The patient knows what he wants, he just needs a performer   | The patient needs help in identifying both the needs and the possibilities for meeting them   |

Source: Kapliński, Łysiak, Pięcińska, 2001, p. 10.

The table above shows how important properly managed personnel are and how crucial their correct placement is, as it is through the personnel that a facility gains its reputation and can achieve a competitive advantage. Well-managed personnel and internal communication are discussed by authors such as M. Lasota, A. Rychlicka, A. Ryś, W. Stępień (Lasota, Rychlicka, Ryś, Stępień, 2000), and A. Pabian (Pabian, 2002). "Managing a healthcare facility, department, or personnel, whether medical or nursing, requires detailed planning of one's education, recognizing personal capabilities, and opportunities in the environment, with superiors and future subordinates" (Kapliński, Łysiak, Pięcińska, 2001).

## Methods

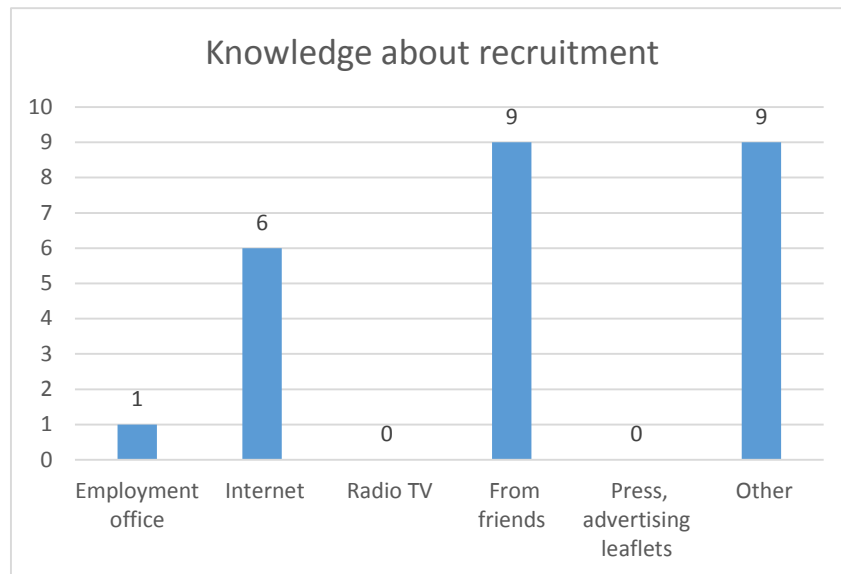
For this study on human capital management in healthcare facilities, particularly in the context of people as the fifth element of the marketing mix for services, an interview using a survey questionnaire was conducted. The questionnaire consisted of 21 questions, including open-ended, closed-ended dichotomous, and semi-open questions. Due to a clearly defined

goal, thematic scope, and time and budget constraints, the study was based on non-random purposeful sampling, selecting typical units. Inquiries were sent to healthcare facilities regarding their willingness to participate in the study. The thematic scope was presented. The study was voluntary. Participants included employees from several healthcare facilities, both public and non-public. For this study, no distinction was made between employees of these types of facilities. The author does not exclude the possibility of examining the staff's approach concerning the type of facility they work in the future. Comparing hospital wards with clinics seems particularly interesting due to their specificities. The study lasted from May to July 2024. Responses to the survey were received from 25 individuals. These individuals are employed in positions ranging from higher medical personnel to mid-level medical staff (e.g., nurses) and non-medical personnel such as secretaries and registrars. As healthcare facilities are generally overburdened with work, the personnel were not very willing to respond.

## Results

The survey was conducted between May and July 2024. The aim of the survey was to identify the main areas related to human capital management, among the staff of healthcare facilities, and to highlight these important issues from the employees' point of view. Twenty-five healthcare facility staff participated in the survey. 12 employees work in public facilities and 13 in non-public facilities. For 11, this is the only place of employment. Comparing this with their occupation, these are mainly mid-level medical and non-medical employees. Among the respondents, women outnumbered men by 17 to 8. The main respondents were 51-65 year olds - 11, the second group was 20-35 year olds - 8. This group included 13 doctors, 9 mid-level medical staff and 3 support staff not directly related to the medical profession.

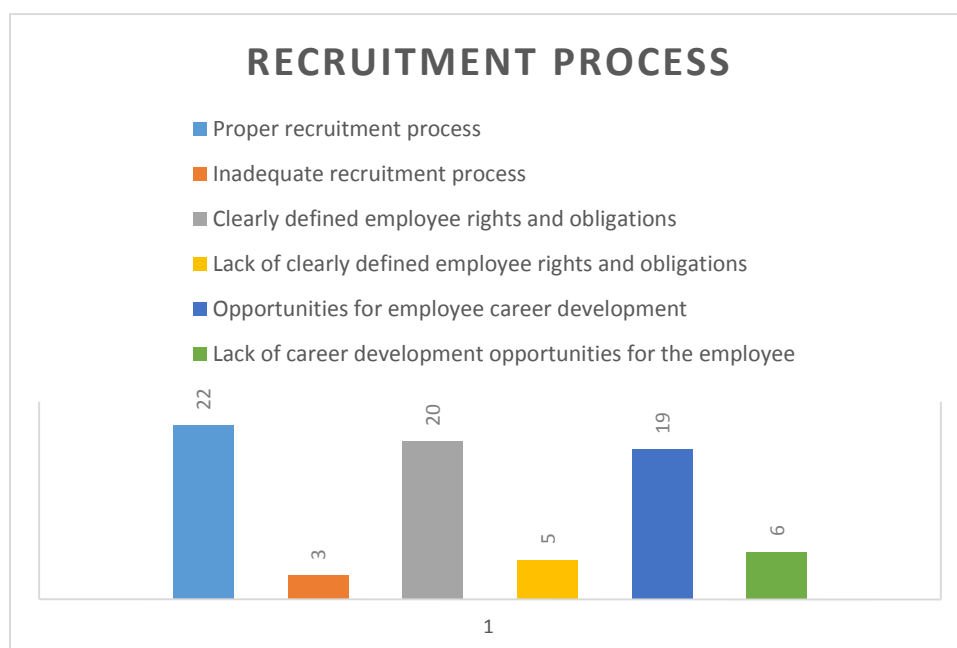
Turning to the main elements of the survey, the responses regarding the recruitment process are very distinctive. The majority of the respondents, 23 in fact, encountered a one-stage recruitment process when they were admitted to a post. This consisted of submitting documents to the unit in question and waiting for a response. Only 2 people were subjected to a two-stage vetting process, i.e. they were invited to an initial interview. They were mid-level medical staff and applied to a non-public unit. Generally speaking, it can be concluded that due to staff shortages in the medical profession, there is no systematic verification of applications on the Polish market (PAP/AT Coraz większe braki kadrowe..., 6.08.2024).



**Figure 1.** How did you find out about the recruitment for the position?

Source: own compilation based on survey.

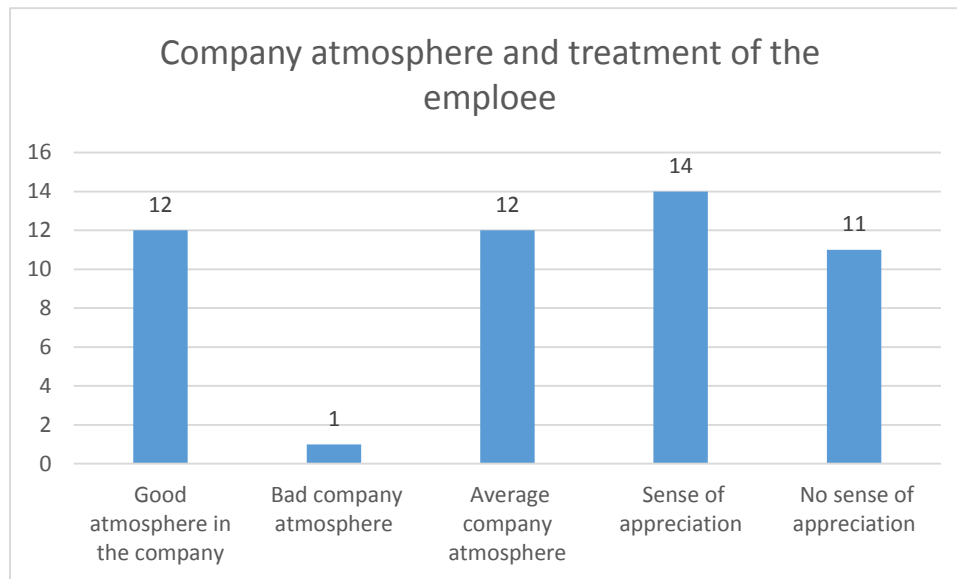
As can be seen from the chart above, the main source of information about a future job position was either the Internet or friends. The Internet is playing an increasingly important role in the development of the competitiveness of a healthcare facility (por. Paszkowska, 2008; Całka, 6.08.2024).



**Figure 2.** The recruitment process.

Source: own compilation based on survey.

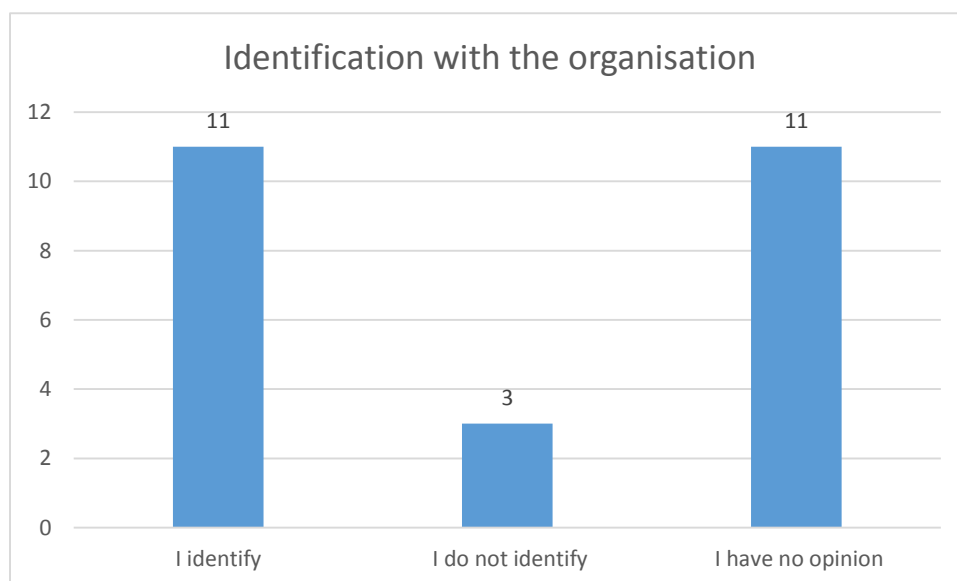
Despite the one-step recruitment process, most employees were satisfied with the process. Also on admission, the employees were given clear objectives and the opportunity for career development was pointed out.



**Figure 3.** Company atmosphere and treatment of the employee.

Source: own compilation based on survey.

The survey shows that, in general, employees do not complain about the atmosphere at work. It ranges from good to average. The feeling of appreciation of the employee at work is much worse, as many as 11 respondents stated that they do not feel appreciated at work

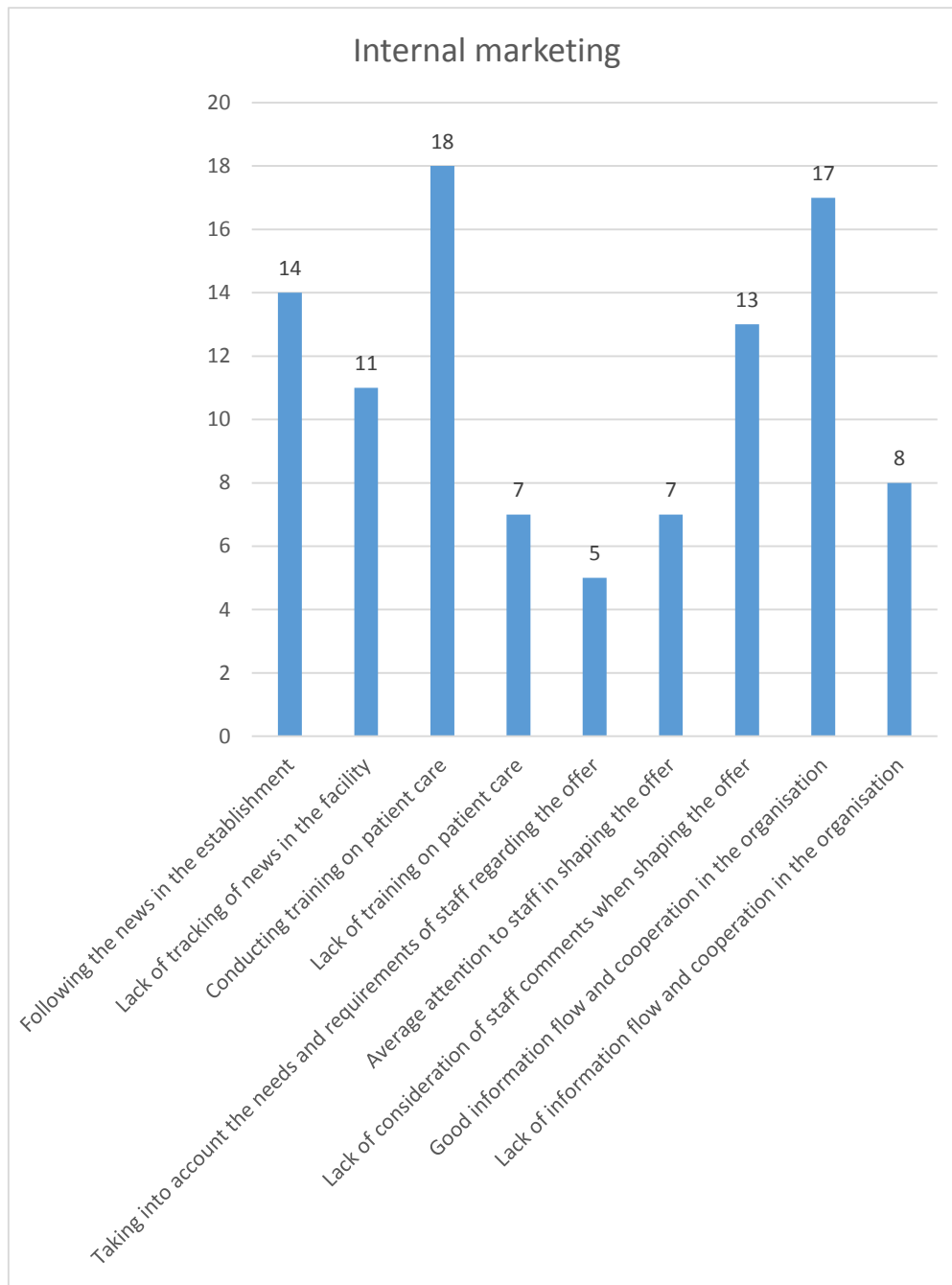


**Figure 4.** Identification with work.

Source: own compilation based on survey.

Looking at the chart above, apparently the lack of identification with the job is not significant, but adding to this the lack of opinion of employees creates a worrying picture of a lack of commitment to the culture system of an organisation. Perhaps this is not surprising, as mainly doctors are independent workers, often working in multiple locations, however, this creates huge management problems.

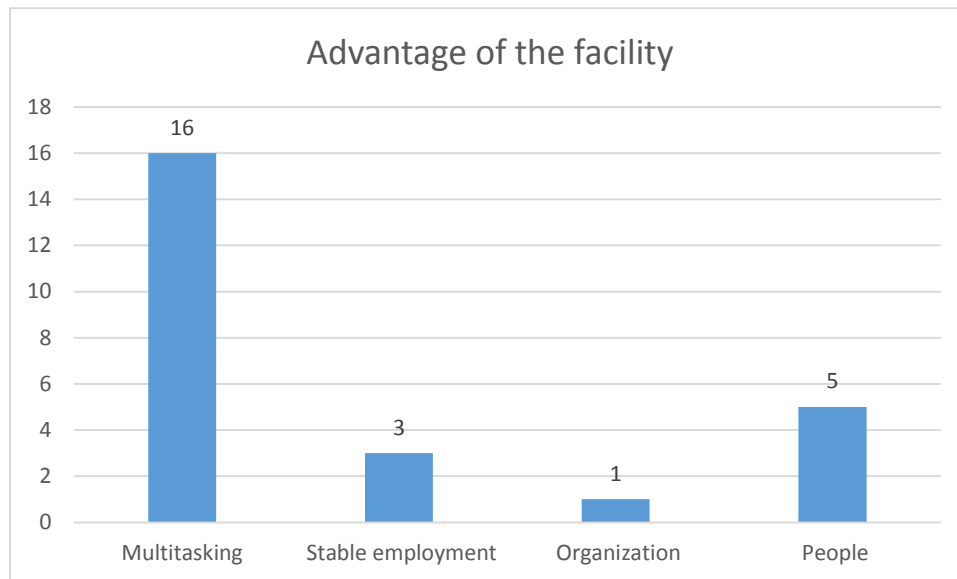




**Figure 5.** Internal marketing.

Source: own compilation based on the survey.

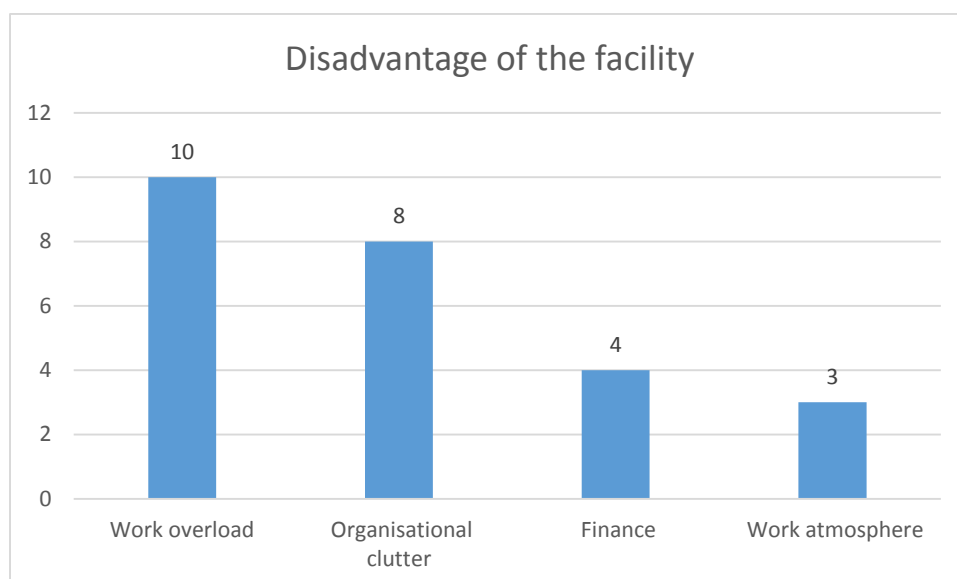
Here we can see that, while patient service training is provided (18 people), in general the flow of information regarding novelty, consideration of employees' opinions and ideas regarding the offer needs to be improved. By involving employees, their sense of empowerment and appreciation from their work is raised. On the other hand, the flow of information shows that it needs improvement, but it is not at an alarming level.



**Figure 6.** Advantage of the organisation.

Source: Own compilation based on surveys.

When asked in an open question about the biggest advantage of the organisation in the eyes of the employees, the respondents mainly marked multitasking. This may indicate that the organisation is seen from the point of view of the patient and identifies with them. People were also mentioned, i.e. the team of people. The least appreciated was work organisation. This may be related to the general overload of staff and the constant changes in the healthcare area.



**Figure 7.** Disadvantage of the facility.

Source: Own compilation based on survey.

Respondents consider work overload and organisational clutter to be the biggest disadvantage of the organisation. At the moment, it is apparent that finances no longer play a significant role in the employee assessment as salary levels in the healthcare sector have improved.

## Discussion

Human resources in service organisations are the fifth very important element in the marketing mix. It is no different in healthcare facilities where, in fact, the medical services provided are based on people. They are mainly what the customer/patient is looking for. Therefore, human capital management in these facilities is a noteworthy element. Many authors pay a lot of attention to it. The emphasis is mainly on identifying the activities of staff as a factor that determines the quality of medical services and increases the competitiveness of the facility (Buchelt-Nawara, 2002). Additionally, it is the people who are the resource that often determines the development of the facility (Krawczyk Grzybała, 2018). Well-motivated and educated staff in healthcare facilities are the foundation for successful achievement of goals. Looking at the results of the research, although they belong to partial ones, they indicate the need for improvements in the personnel management process mainly in internal marketing. This is primarily about involving staff directly or indirectly in the organisation's offering. Creating an atmosphere of empowerment, which, at the same time, can result in the employees identifying more with the organisation. According to Krot and Lewicka - a high level of trust towards employees is a valuable organisational resource and can be a source of competitive advantage (Krot, Lewicka, 2016). In addition, it should be remembered that we are often dealing with high-level professionals who make a number of important decisions on their own in order to motivate them effectively, diverse, often individually selected tools should be used to improve the effectiveness of their work (Głowacka, Mojs, 2015). It is worrying that employees themselves drew particular attention, in addition to the work overload that is permanent in the health sector, to organisational clutter. This element should be further analysed in detail. Its elimination, or reduction, could improve employee wellbeing and contribute to better management of facilities.

## Summary

To summarise the research carried out, attention should be drawn to its partiality, which at the same time points to elements that could be important points in the personnel management process. The aim of the study, which was to look at the problems that managers of healthcare facilities may encounter, was partly achieved. This is indicated by the results. Undoubtedly, a greater sense of agency should be brought to bear in the creation of offers, taking into account the opinion of employees. The sense of organisational clutter that accompanies employees is worrying. This problem could provide material for further research to determine whether this feeling is related to external factors or whether it is caused by problems existing within the organisation itself. It is encouraging that, despite everything,

employees are able to develop their own careers in the facilities, training is provided on how to handle staff and the flow of information is at a satisfactory level.

## References

1. Buchelt-Nawara, B. (2002). Zarządzanie personelem jako czynnik determinujący jakość usług medycznych. *Zeszyty Naukowe, Nr 607*. Wydawnictwo Akademii Ekonomicznej w Krakowie, pp. 45- 55.
2. Całka, A. Wykorzystanie nowych technologii w komunikacji marketingowej ośrodków opieki zdrowotnej w Polsce. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania, No. 39, No. 2*. Szczecin, pp. 327-337, 6.08.2024.
3. Dobska, M., Dobski, P. (2000). *Marketing usług medycznych*. Indor.
4. Głowacka, M.D., Mojs, E. (eds.) (2015). *Profesjonalne zarządzanie Kadrami w podmiotach leczniczych*. Warszawa: Wolters Kluwer.
5. Janowska, Z. (2010). *Zarządzanie zasobami ludzkim*. PWE.
6. Kapliński, A.K., Łysiak, M.R., Pięcińska, T.S. (eds.) (2001). *Zakład opieki zdrowotnej w praktyce, cz. 7, rozdział 5, podrozdział 1, p. 1*. Verlag Dashofer Sp. z o.o.
7. Kotler, P., Armstrong, G. (2010). *Principles of Marketing*. Prentice Hall.
8. Kotler, P., Armstrong, G., Saunders, J., Wong, V. (2002). *Marketing – podręcznik europejski*. PWE.
9. Kotler, P., Shalowitz, J., Stevens, R.J. (2013). *Marketing strategiczny w opiece zdrowotnej. ABC a Wolters Kluwer business*.
10. Krawczyk, N., Grzybała, Ł. (2018). Kapitał ludzki w przedsiębiorstwach podmiotów leczniczych. *Marketing i Zarządzanie, no. 1(51)*, pp. 225-233, DOI: 10.18276/miz.2018.51-22.
11. Krot, K., Lewicka, D. (2016). *Zaufanie w organizacji innowacyjnej*. Warszawa C.H. Beck.
12. Lasota, M., Rychlicka, A., Ryś, A., Stępień, W. (2000). *Public relations w ochronie zdrowia*. Uniwersyteckie Wydawnictwo Medyczne „Versalius”, p. 15.
13. Pabian, A. (2008). *Promocja – nowoczesne środki i formy*. Difin sp. z o.o.
14. PAP/AT Coraz większe braki kadrowe wśród lekarzy specjalistów. Będzie tylko gorzej, <https://www.pulshr.pl/rynek-zdrowia/lekarze-specjalisci-nie-chca-zarabiac-mniej-niz-rezydenci,106714.html?mp=promo>, 6.08.2024.
15. Paszkowska, M. (2008). Rola Internetu w promocji zdrowia. *Przegląd Medyczny Uniwersytetu Rzeszowskiego, no. 3*. Rzeszów, pp. 244-252.
16. Romanowska, M. (2011). Zarządzanie Kapitałem Ludzkim. *Zeszyty Naukowe Uniwersytetu Szczecińskiego. Finanse, Rynki Finansowe, Ubezpieczenia, no. 46*, pp. 171-182.

## IMPLEMENTATION OF THE PROCESS MANAGEMENT CONCEPT IN SMALL AND MEDIUM-SIZED ENTERPRISES

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**Purpose:** The aim of this study is to answer the question of whether the surveyed companies, belonging to a group of small and medium-sized enterprises that have recently undergone changes in the area of production logistics, have moved in the direction of implementing process management and, if so, to what extent this concept has been successfully implemented.

**Design/methodology/approach:** The subject of the study was 7 companies. The study used a questionnaire method, which was administered to 21 people. The questionnaire consisted of 15 questions in the form of affirmative sentences (statements) with answers using a 5-point Likert scale.

**Findings:** The survey shows that, when implementing process management in the companies under study, there is a definite deficiency in the dissemination of the new concept to all employees, group work and exchange of experiences, as well as the implementation of new decision-making paths, the concept of the internal customer and, finally, a change in the whole company's system of values.

**Research limitations/implications:** The survey was conducted among small and medium-sized enterprises and therefore does not include the perspective of large companies.

**Practical and social implications:** The survey has the potential to contribute to a better understanding by companies of the directions which changes are taking and the direction which these changes may take. It will help to increase companies' process awareness and thus, in the long term, help them to achieve a better competitive position in the market.

**Originality/value:** This study belongs to the current research on process management. In view of the subject of the study, which comprised small and medium-sized enterprises that have recently undergone changes in the area of production logistics, specific new conditions have arisen in these companies that require more detailed analysis.

**Keywords:** process management, reorganisation, production logistics.

**Category of the paper:** research paper.

## 1. Introduction

Among the many management methods and concepts present in the literature and also in the services that consulting companies have been offering for a number of years, the concept of process management, which derives from a process orientation, comes to the fore.

The process approach consists of viewing an organisation as a set of interrelated processes that aim to deliver value to the customer. Focusing on processes allows companies to better organise work, standardise activities, optimise resources and continuously improve efficiency. Consequently, companies can react faster to changing market conditions, increase the quality of their products and services and achieve better business results. This approach contrasts with the functional approach, which sees primarily 'departments' performing different types of functions. Each department focuses on its own tasks without, as it were, gaining a comprehensive perspective. The process approach puts business processes at the centre. It is an approach which holds that processes in an organisation are interrelated and intermingle, and that the whole organisation is a dynamic system. The purpose of the whole system is to satisfy the needs of the customer, and under the system processes can be planned, measured and managed. The process approach is very common, and can be applied in basically any field of activity, including non-commercial ones, such as in administration (Wieczorkowski, 2015) or in universities (Maciąg, 2016).

Process management appears to be very fashionable, but in practice it does not deliver the promised and expected results because it is considerably difficult to implement. It also happens that companies undertake to implement changes and, although the chosen direction is towards process management, the intended goal of major process maturity is not fully achieved. The aim of this study is to answer the question of whether the studied companies, belonging to the group of small and medium-sized enterprises that have recently undergone changes in the area of production logistics, have taken a direction towards the implementation of process management and, if so, to what extent they have been able to implement this concept.

## 2. Process management

There are nowadays many models of business management, but there is some consensus that process management, also called process orientation, is one of the most widely and frequently used and appears to be a dominant paradigm in management (Romanowska, Trocki, 2004). As a method, it has already reached a certain level of maturity and is widely described in the literature and is also present at universities in study programmes and conferences. The number of practical applications of the method is also growing (Krosan-Przywara,

Zgrzywa-Ziemak, 2011). Its popularity is understandable, as it has many advantages. Since the 1990s, it has begun to be seen as a cure for the problems of organisations that were performing poorly as a result of increasing customer demands. Process management is characterised by customer orientation, a comprehensive view of the organisation, monitoring of lead times, product and service quality, rational cost generation and increased flexibility, which are all aimed at achieving competitive advantage (Brajer-Marczak, 2012).

Central to the process approach is the very notion of a process, defined as a sequence of activities and sequentially occurring actions that result in the transformation of what is at the input of the process on to the outputs. Process outputs can be products or services. The process approach has received multiple definitions in the literature. It is noted that there are terms such as process approach (process orientation), managing of the processes and process management and that they are very often used interchangeably, although this is not necessarily justifiable; however, in the English-language literature the term Business Process Management is used (Bitkowska, 2019). It is rather frequent that process management is not defined but then its characteristics are provided (Nowosielski, 2011). In this discussion, which does not claim to be a meticulous and comprehensive review of all definitions, no attempt will be made to systematise them. However, following Nowosielski, it is assumed here that the concepts of managing of the processes and process management stand in a superior relation to each other: process management should be interpreted more broadly, in the sense of a philosophy and management orientation, as opposed to managing of the processes, understood as a management method. Managing of the processes is found in modern organisations at various levels of maturity, whereas process management is not always the case (Nowosielski, 2008). The process approach involves managing a company by focusing on the processes that make up the day-to-day functioning of the organisation. Instead of managing a company in a traditional hierarchical way, the process approach focuses on the flow of activities that aim to deliver value to customers. This means that the company is managed as a network of integrated processes that have a clearly defined purpose, resources, participants and a way of measuring its performance. It is also indicated that process management can be divided into stages: process identification, process modelling, process implementation and process control. There is also a need to simulate and optimise the process in a given company (Bitkowska, Sobolewska, 2020). However, regardless of the terminological and definitional complexities, certain features of the process approach, present in the idea of process management, can be distinguished. These include:

- analysing the processes involved in meeting customer needs and improving them systematically. Creating customer value;
- group work when improving processes. Staff training is carried out when processes are being implemented. Groups are linked horizontally and vertically. Continuous learning and sharing of experience. Involvement of all employees and shared responsibility;

- intra-company relations: supplier - customer. Concept of internal and external customers;
- flattening of hierarchical structures, decentralisation of decisions, change of organisational culture and value system;
- continuous monitoring of the course of processes and making adjustments to increase their efficiency (Bitkowska, 2019).

The process approach produces many positive effects that have a significant impact on the functioning and efficiency of an organisation. It enables organisations to accurately analyse and optimise each step of the operation, eliminating waste and bottlenecks. The standardisation of processes and the continuous monitoring of their effectiveness allows a high level of quality to be maintained. Processes are more transparent and organisations can more easily identify where changes can be made. A process-based approach is conducive to responding quickly to market changes, new technologies or customer expectations. Processes are described and measured in detail, allowing for accurate monitoring of each stage of the process. The process approach is geared towards delivering value to the customer, resulting in a better response to customer needs and higher quality services and products. It also results in increased customer satisfaction and loyalty and a better reputation for the company in the marketplace.

However, the literature also addresses the problem of implementing process management as it faces many barriers in practice. A variety of classifications with different levels of detail appear here (Yurchuk, 2021). Jagodziński and Ostrowski (2015) review the literature in search of such barriers. They include lack of theoretical underpinning, poor communication, inadequate management style, lack of financial resources, lack of time for implementation, poor IT infrastructure, lack of a clear way to implement the process approach, reluctance and lack of motivation on the part of employees, misunderstandings between employees and lack of support from management.

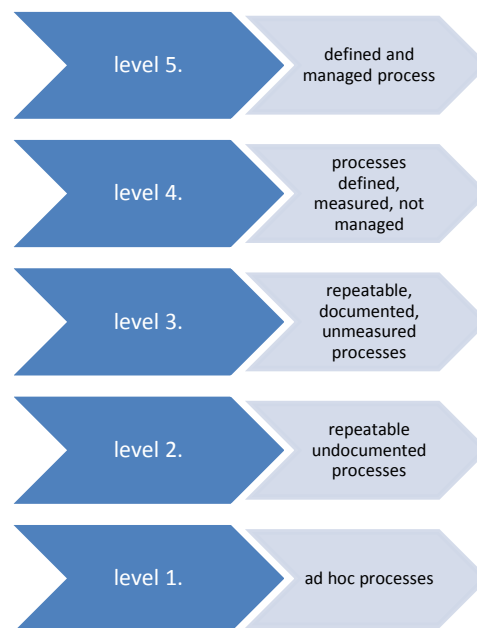
### **3. Process maturity**

The popularity of the process approach makes the level of process management one of the basic criteria for assessing the quality of business management and should be added to the traditional indicators for assessing organisations (Grela, 2013). Hence, it is referred to as the process maturity of an organisation. It can be understood, for example, as the ability of an organisation, including its processes, to systematically improve the delivered results of its activities (Kalinowski, 2011) or as a state in which it is possible to repeatedly achieve the same process result in relation to predefined key factors (Brajer-Marczak, 2012). Awareness of process maturity allows an organisation to better control, optimise and standardise its activities,



leading to greater efficiency and risk reduction. This makes the organisation more flexible, innovative and able to react faster to changes.

Process maturity is gradual in nature, it can be lower or higher, and companies can continuously reach successive stages of maturity. Individual levels of process maturity form the structure of process maturity models. They constitute the currently very popular ways of assessing process maturity described in the literature. They are developed both by academics, organisations, most often large corporations, and consulting firms that suggest many benefits from their implementation (Brajer-Marczak, 2017). One of the most popular models used to assess process maturity is the CMMI (Capability Maturity Model Integration) model. This model distinguishes five levels of process maturity.



**Figure 1.** CMMI process maturity levels.

Source: *Dojrzałość procesowa polskich organizacji. Podsumowanie IV edycji badania dojrzałości procesowej organizacji funkcjonujących w Polsce* (2020). [www.procesowcy.pl](http://www.procesowcy.pl)

At level 1, also known as the initial level, processes are random. There is no awareness that the activities carried out in the organisation form processes (processes are not defined), there is no internal customer category, and the dominant management approach is the functional approach. At level 2, the so-called repeatable level, processes are repeatable but not defined, not described and not measured. In organisations at this level, it is noticed that there is an awareness of the processes within the organisation, and the essence of the internal customer is also beginning to be understood. However, the processes are not documented in any way. The next level, level 3, also known as defined, is where processes are being defined and described, but not measured. Here there is full awareness of the processes and they are also documented. At level 4, known as the quantitatively managed level, processes are identified, measured, documented, planned and monitored, but not managed. This means that information from process measurements is not used in management decision-making. At the last, 5th, level,

the so-called optimizing level, processes are defined, described, measured, documented, planned, monitored and managed (Raczynska, 2017).

With reference to, among other things, this model, in recent years, the literature has presented the results of research on the assessment of process maturity of Polish enterprises. Particularly well-known is the report *procesowcy.pl*, which is regularly presented online, however, many such studies as well as studies summarising them can be found. From these studies, Grela draws the conclusion that Polish organisations have a great potential to improve their efficiency by improving their processes.

#### **4. Research hypotheses and methodology**

The brief analysis of the state of knowledge on process management in companies presented above allows us to conclude that it is worthwhile to introduce process management in organisations and then to determine the level of process maturity to help companies achieve their goals. At the same time, it is known that this is very difficult in practice and that not all companies are moving towards the introduction of process management. The aim of this study is to answer the question of whether, in the surveyed enterprises belonging to the group of small and medium-sized enterprises where changes are being made in the area of production logistics, it has been possible to give these changes such a direction that it is possible to speak of the implementation of process management. Furthermore, it can be assumed that the implementation of changes in small and medium-sized enterprises has its own specificity. Thus, the following research hypotheses can be formulated:

- h1) changes in small manufacturing companies rather take into account process management within production, they are not directly and firmly moving towards process management,
- h2) process maturity in the companies surveyed is at level 2-3.

The subject of the study was 7 enterprises, including those in the clothing, construction, waste processing (recycling) industries, classified as small and medium-sized enterprises, in which production logistics reorganisation processes have recently been carried out. Some of the respondents with managerial roles were also owners of the companies. Companies that were friends of the authors and to which they had access and who were willing to take part in the study were selected for the survey.

A questionnaire consisting of 15 questions was used, relating to developments indicating the emergence of process management changes recently carried out at the company. The questions in the survey were structured in such a way as to obtain verification of the two hypotheses posed. Some of the respondents spontaneously shared their opinions on the themes raised in the survey, which was taken into account in the interpretation of the results.

## 5. Research results

Responses were obtained from 21 individuals. The questionnaire consisted of 15 questions in the form of affirmative sentences (statements) with responses using a 5-point Likert scale. For each statement, respondents could choose from 5 responses consisting of a verbal and numerical description, arranged in order from total rejection to total acceptance:

1. strongly disagree,
2. tend to disagree,
3. neither yes nor no,
4. tend to agree,
5. strongly agree.

On this basis, a weighted average was calculated for each statement obtaining information on the strength and direction of attitudes towards each statement. The responses are presented in Table 1.

**Table 1.**

*Questions, content of questions and weighted averages for each question*

| N°  | Question/Response   | I strongly agree | I tend to agree | Neither yes nor no | I tend to disagree | I strongly disagree | Weighted average |
|-----|---|------------------|-----------------|--------------------|--------------------|---------------------|------------------|
|     |   |                  |                 |                    |                    |                     |                  |
| Q1  | The changes were necessary  | 81               | 14.28           | 4.76               | 0                  | 0                   | <b>4.76</b>      |
| Q2  | As part of the changes carried out, processes were identified in our company  | 47.61            | 47.61           | 0                  | 4.76               | 0                   | <b>4.38</b>      |
| Q3  | As part of the changes carried out, we were shown how to manage processes (how to plan, design, measure and implement them)                                     | 47.61            | 38.1            | 14.28              | 0                  | 0                   | <b>4.33</b>      |
| Q4  | As part of the changes made, practically the whole company has changed  | 0                | 9.52            | 9.52               | 81                 | 0                   | <b>2.28</b>      |
| Q5  | The changes were driven by the need to adapt to customers in order to create customer value   | 42.8             | 42.8            | 9.5                | 0                  | 4.76                | <b>4.14</b>      |
| Q6  | We worked as a team to improve processes in our company   | 4.76             | 33.33           | 9.52               | 52.38              | 0                   | <b>2.95</b>      |
| Q7  | When implementing the changes, employee training was carried out  | 81               | 19.04           | 0                  | 0                  | 0                   | <b>4.8</b>       |
| Q8  | We worked in groups and each group was free to communicate with other groups  | 4.76             | 28.57           | 9.52               | 57.14              | 0                   | <b>2.8</b>       |
| Q9  | Implementing change was about constant sharing and continuous learning  | 23.8             | 23.8            | 4.76               | 47.61              | 0                   | <b>3.2</b>       |
| Q10 | All employees were involved and all were responsible for the changes being made   | 14.28            | 19.04           | 9.52               | 57.14              | 0                   | <b>2.9</b>       |
| Q11 | Since the introduction of the changes, we have introduced the concept of the 'internal customer' - we know who the internal customer is and how important it is | 9.52             | 9.52            | 0                  | 42.8               | 38.1                | <b>2.09</b>      |
| Q12 | The hierarchical structures in our company have been changed, there are fewer 'tiers' and the organisational structure is flatter                               | 14.28            | 71              | 0                  | 14.28              | 0                   | <b>3.85</b>      |

|     |   |       |       |      |       |       |             |
|-----|---|-------|-------|------|-------|-------|-------------|
| Q13 | Decisions are now taken not centrally but at lower levels   | 9.52  | 47.61 | 4.76 | 28.57 | 9.52  | <b>3.19</b> |
| Q14 | The system of values in the company has changed   | 4.76  | 4.76  | 9.52 | 33.33 | 47.61 | <b>1.85</b> |
| Q15 | We are continuously monitoring our company's processes and continuously making adjustments to increase efficiency | 14.28 | 47.61 | 4.76 | 33.33 | 0     | <b>3.42</b> |

Source: own elaboration.

The first question examined whether respondents perceived a need for change in their businesses at all (Q1). Overall, more than 95% of respondents felt that changes were necessary. The result is not surprising, as the survey was conducted specifically in the companies where reorganisation had already taken place and the need for it had been decided earlier. The aim was to improve quality or efficiency and, in some cases, to introduce a new product. Some shortcomings were therefore identified in the companies as well as the need to address them. It should also be mentioned that, in many cases, the changes were dictated by the wish to reduce customer complaints.

In the next step, respondents identified the scope and nature of the changes made (Q2, Q3). Again, more than 95% of respondents felt that processes had been identified in their companies as part of the reorganisation. This means that those carrying out the changes were able to make middle-level managers (sometimes the managers themselves were the ones making them aware) aware of the direction and basic idea of the changes, i.e. the concept of process as the basic orientation in action. Slightly fewer respondents (85%) felt that the changes carried out showed them how to manage processes, i.e. how to plan, design, implement and measure them. Only 3 people had no opinion on this (14.28%). This may indicate that while the respondents are aware of the new concept and its essence, the specific process management activities made it a bit more challenging for them.

The responses to the next question revealed the extent of the changes carried out (Q4). Only 2 people (9.52%) felt that the entire company had actually changed as a result of the reorganisation. As many as 81% were of the opposite opinion. This is an extremely important observation, as it proves that process management is very difficult to carry out to such an extent that it covers the entire organisation. In the companies surveyed, changes and process management extended to production logistics. This confirms Nowosielski's observation that it is the area of production logistics that is most predestined to implement process management.

The answers to the next question (Q5) proved that the second important element of the concept - customer orientation - was understood in the surveyed companies. More than 85% of respondents 'rather' or 'strongly' agreed with the statement that the changes were driven by the company's need to align with customers in order to create value for them. While prioritising the customer is not a new concept, and has been in business practice for a long time, the survey found that respondents are aware that customer orientation needs to be improved all the time. Group work scored slightly worse according to respondents (Q6). More than half of the respondents (52.38%) disagreed with the statement that group work took place during the company's processes. 38.06% of respondents agreed with this statement. Similarly,

only 33.33% of respondents confirmed that they worked in groups during their shifts and each group was free to interact with other groups (Q8). However, group work is an important element of process management. The lack of group work is a sign that the changes carried out in the companies were not of a process management nature: there was most likely no exchange of experience between groups, and perhaps not everyone was involved in the changes. This may be slightly surprising, as to the next question, regarding the giving of training to employees (Q7), all respondents answered that training was given in their companies as part of the reorganisation. This could mean that the training was either one-off events or targeted at specific groups between whom no cooperation developed. Thus, it becomes clear that not all employees were involved and an atmosphere of shared responsibility was not created. This statement is confirmed by the answers to the next two questions (Q9, Q10), in which 47.61% of the respondents disagreed with the statement that the implementation of change was based on continuous exchange of experience and continuous learning, and 57.14% disagreed with the statement that all employees were involved and all employees shared the responsibility for the changes made.

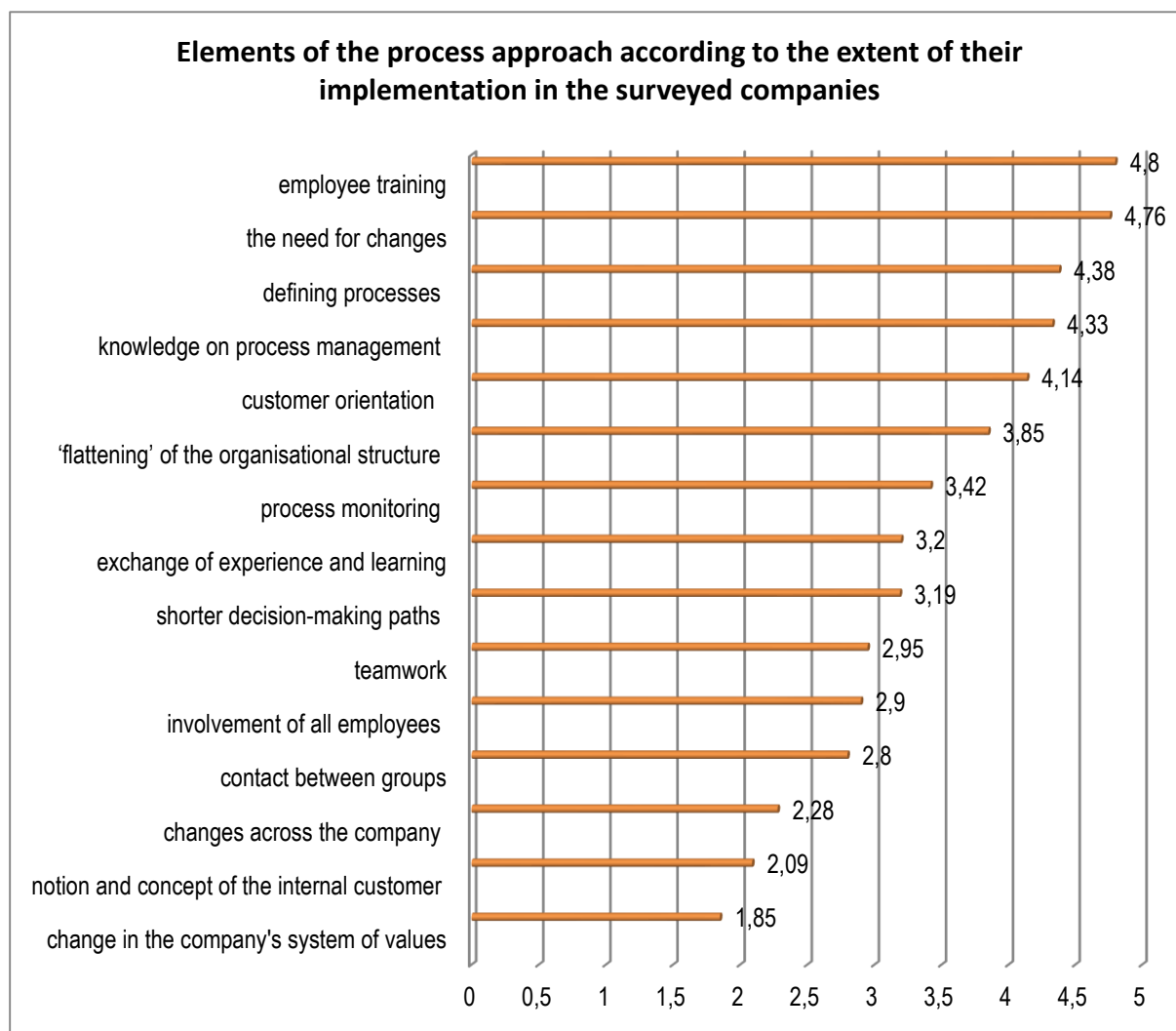
The respondents were also not convinced by the concept of the 'internal customer' during the course of the changes (Q11). Only 19.04% of respondents agreed with the statement that the internal customer has been talked about and is important since the introduction of change in the company. Thus, while the concept of the customer is well-known and its prioritization is recognised (Q5), seeing the internal customer is still not a common approach. From the point of view of the process management concept, this element is extremely important, so its absence may mean that the principles of the concept have not been introduced.

In the companies surveyed, organisational structures were restructured as part of the reorganisation, flattening them out and eliminating some of their levels. This was noted by as many as 85.28% of the respondents (Q12). This fact is somewhat understandable, as changing organisational structures was one of the main elements of change in the surveyed organisations. However, it turns out that changes in organisational structure entailed changes in the way decisions were made only according to 57.13% of the respondents. The remaining 38.09% disagreed with the statement that decisions are now made not centrally but at lower levels (Q13). This could mean that the changes in organisational structures have not been carried out in a way so as to shorten the decision-making path and move decision-making to lower levels, the culture of the organisation has not changed, which is after all the domain of the process approach.

Only 9.52% of the respondents believed that as part of the changes carried out in the organisation, the system of values in the company had also changed (Q14), and as many as 80.94% disagreed with this statement. Thus, if it is assumed that process management is a holistic concept, encompassing the entire enterprise, including its system of values, then it can be concluded that, in the case of the surveyed companies, not all the assumptions of this concept have been implemented. Also, another element of the concept, i.e. the constant

monitoring of the course of processes and the introduction of adjustments to increase their efficiency, has not been fully introduced in all the surveyed companies, although here as many as 61.89% of the respondents indicated that processes are constantly monitored (Q15).

The analysis of the weighted average results obtained on the Likert scale makes it possible to order the elements of the process approach according to the extent of their implementation in the surveyed companies.



**Figure 1.** Elements of the process approach according to the extent of their implementation in the surveyed companies.

Source: authors' own elaboration.

The most widely adopted element appeared to be employee training (4.8). This is understandable, as they were a prerequisite for the introduction of change in companies, and an essential element of the change. Indeed, without employee training it would be impossible to transfer knowledge regarding the new order. It is also important to note that there was a rather widespread acceptance of the reorganisation processes introduced (4.76), which indicates that enterprises were not prejudiced against it, but rather showed a positive attitude, which is, after all, a prerequisite for the implementation of process management.

The identification of processes in the surveyed companies (4.38), the transfer of process management knowledge (4.33) and customer orientation (4.14), i.e. key elements of process management, can also be regarded as having been introduced successfully. Changes have been made to organisational structures, aiming to flatten them out (3.85) and also process monitoring is being carried out (3.42). Other elements of process management have been introduced to a slightly lesser extent. Experience sharing and learning (3.2) and short decision paths (3.19) have not been introduced extensively. Group work (2.95), the involvement of all employees (2.9) and the contact of groups with each other (2.8) were almost completely failed to be introduced. There has been almost no success in introducing the concept of the 'internal customer' in companies (2.09), and certainly no change in the companies' systems of values.

## 6. Conclusions

The study can therefore be considered to have confirmed both research hypotheses (h1) and (h2) set out in the introduction. The changes carried out in the companies mainly involved production processes, however, the changes did not go beyond this area (h1). Admittedly, it was noted that it is the process that lies at the heart of all activities, the focus was successfully shifted to the process, and general acceptance was achieved among employees for the new way of thinking. Unfortunately, the new approach has remained in the realm of declarations and concepts, which also manifests itself in the way the organisation is talked about. The research hypothesis (h2), according to which the surveyed companies are at level 2 or 3 of process maturity, was also confirmed. In most cases, processes are repeatable, documented but not measured or, if measured, they are not managed. However, it should be made clear that this aspect has not been studied very intensively and, in order to obtain an accurate assessment of process maturity, the study would have to be repeated with a focus on the process approach in particular. If the changes carried out are analysed in terms of the introduction of process management in companies, it should be noted that the basic problem here is precisely their being limited to the field of production. What is definitely lacking is the dissemination of the new concept to all employees, group work and the exchange of experience, as well as the implementation of new decision-making paths, the concept of the internal customer and, finally, a change in the system of values of the entire enterprise. The question of the reasons for this state of affairs, i.e. the barriers that have emerged during implementation and the methods by which they can be overcome, remains open for further research.

## References

1. Bitkowska, A. (2019). *Od klasycznego do zintegrowanego zarządzania procesowego w organizacjach*. Warszawa: C.H. Beck.
2. Bitkowska, A., Sobolewska, O. (2020). Zarządzanie procesowe z wykorzystaniem wiedzy w polskich przedsiębiorstwach. *Przegląd Organizacji, Vol. 1*.
3. Brajer-Marczak, R. (2012). Efektywność organizacji z perspektywy modelu dojrzałości procesowej. In: P.R. Antonowicz (Ed.), *Zarządzanie i Finanse, Vol. 10, Iss. 1*. Sopot: Wydział Zarządzania Uniwersytetu Gdańskiego.
4. Brajer-Marczak, R. (2012). Podejście procesowe w organizacjach – wyniki badań. *Nauki o zarządzaniu, Vol. 3(12)*.
5. Brajer-Marczak, R. (2017). Bariery upowszechniania modeli dojrzałości procesowej. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Vol. 463*.
6. *Dojrzałość procesowa polskich organizacji. Podsumowanie IV edycji badania dojrzałości procesowej organizacji funkcjonujących w Polsce* (2020). [www.procesowcy.pl](http://www.procesowcy.pl)
7. Grela, G. (2013). Ocena poziomu dojrzałości procesowej organizacji. *Nierówności społeczne a wzrost gospodarczy, Vol. 35*.
8. Jagodziński, J., Ostrowski, D. (2015). Bariery we wdrażaniu podejścia procesowego w przedsiębiorstwach w Polsce. *Zeszyty Naukowe Wyższej Szkoły Bankowej we Wrocławiu, Vol. 15, Iss 7*.
9. Jurczuk, A. (2021). Barriers to implementation of business process governance mechanisms. *Engineering Management in Production and Services, Vol. 13, Iss. 4*, pp. 22-38.
10. Kalinowski, T.B. (2011). Modele oceny dojrzałości procesów. *Acta Universitatis Lodzianis Folia Oeconomica, Vol. 23, Iss. 258*.
11. Korsan-Przywara, P., Zgrzywa-Ziemak, A. (2011). Zarządzanie procesowe. In: M. Hopej, Z. Kral (Eds.), *Współczesne metody zarządzania w teorii i praktyce*. Wrocław: Oficyna Wydawnicza Politechniki Wrocławskiej.
12. Maciąg, J. (2016). Zastosowanie podejścia procesowego w zarządzaniu publicznymi szkołami wyższymi – wyzwania teorii i praktyki. *Nauka i Szkolnictwo Wyższe, Vol. 1, Iss. 47*.
13. Nowosielski, S. (2011). Orientacja procesowa w organizacjach. Rozważania nad skutecznością wprowadzania. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Vol. 169*.
14. Nowosielski, S. (2018). Zarządzanie procesami jako współczesna koncepcja zarządzania: istota i problemy wdrażania. *Przedsiębiorczość i Zarządzanie, Vol. 9, Iss. 2*, pp. 17-26.
15. Raczyńska, M. (2017). Modele dojrzałości procesowej organizacji. *Acta Universitatis Nicolai Copernici, Vol. 2*.



16. Romanowska, M., Trocki, M. (2004). *Podejście procesowe w zarządzaniu*. Warszawa: SGH.
17. Wieczorkowski, J. (2015). Analiza wykorzystania podejścia procesowego w zarządzaniu jednostkami administracji publicznej. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, Vol. 243.



## KNOWLEDGE MANAGEMENT IN PRODUCTION LOGISTICS REORGANISATION PROCESSES

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**Purpose:** the purpose of this paper is to understand how newly emerging knowledge is managed in companies undergoing reorganisation within the scope of production logistics. Four elements of the knowledge management process are examined and an attempt is made to diagnose the place and nature of the problems that occur in this process.

**Design/methodology/approach:** the study used a qualitative method. In-depth interviews were conducted in 5 companies with 13 middle and senior managers who were involved in reorganisation processes. The study spanned the period from January to June 2024.

**Findings:** the study shows that the least effective stage is the distribution (transfer) of knowledge to production employees. The biggest problem is the internalisation of knowledge at the lowest levels by employees at individual workstations.

**Research limitations/implications:** the study was conducted among small and medium-sized enterprises and therefore does not take into account the perspective of large companies. It also only addresses knowledge management in the context of production logistics reorganisation and therefore does not focus on other types of reorganisation.

**Practical implications:** understanding the essence of knowledge management is the basis of a successful reorganisation process. Knowledge of its phases and awareness of the shortcomings in the process in small and medium-sized enterprises make it possible to carry it out in a more organised and sustainable way.

**Social implications:** the study may contribute to an increased awareness of reorganisation processes in enterprises and thus to their effectiveness and efficiency. This is then likely to improve the competitiveness of enterprises.

**Originality/value:** this study is part of the trend in the research on knowledge management. Its uniqueness consists in presenting knowledge management in the specific conditions created by the reorganisation process in the area of production logistics. In doing so, it is enriched by a diagnosis of the source of possible failures and an evaluation of the process by the people responsible for the initiation and execution of the process.

**Keywords:** knowledge management, reorganisation, production logistics.

**Category of the paper:** research paper.

## 1. Introduction

It is clear to modern businesses that in order to remain competitive in the marketplace, it is necessary to constantly adapt to the conditions of the changing environment. Change for a company can be of various nature and scope. For manufacturing companies, changes in the area of production are extremely important, if not crucial. These, too, may concern various areas and range from technological changes to organisational changes in the area of production logistics, changes in personnel, may involve individual operations, processes or entire production lines. All methods of production organisation and management improve existing production systems or enable the design and implementation of new systems in which production factors should reach the right level.

Regardless of the nature or extent of the changes within production, new knowledge is created as a result of the changes taking place within the company and this knowledge must be managed appropriately. This is because only its appropriate transfer will ensure the effectiveness of the reorganisation process. Knowledge needs to be properly consolidated, shared and protected. The right people in the company must become acquainted with it and then be able to use it. Only in this way can the reorganisation process succeed.

In this article, the authors attempt to analyse and evaluate knowledge management in companies that have undergone process reorganisations in the area of production logistics. Barriers that have prevented, in some cases, an effective knowledge transfer and thus a fully successful reorganisation will also be shown.

## 2. Knowledge management

Today, knowledge is recognised as a fundamental potential in the modern economy and is treated as a source of economic success or failure (Kłak, 2010). Knowledge is recognised as the main wealth of an organisation and its key resource, which has not been challenged in the literature for a long time (Drucker, 1996; Stankiewicz, 2006; Koźminski, 2005).

In management science, the concept of knowledge management is not at all new. It has also been interpreted in various ways. Earlier, different terms were used to describe this phenomenon. It was dealt with by theoreticians of strategic management, specialists in innovation and technology management, researchers in the area of people management and computer scientists. Knowledge management has also received a number of definitions, formulated by consultancies and management theorists, emphasising many different aspects. One group of definitions emphasises an organisation's customers and employees and its market performance. From these definitions it can be concluded that knowledge management is the

process that an enterprise uses to gather, organise, share and analyse its knowledge in a way which is easily accessible to employees. This knowledge can include technical resources, frequently asked questions, training documents and other information.

Knowledge management (KM) is a multidisciplinary field that involves the creation, storage, retrieval, and dissemination of knowledge within organizations to improve performance and competitiveness (Gupta, Iyer, Aronson, 2000). It encompasses both technological tools and organizational routines (Petrovic-Randelovic, Stankovic, 2005) and is crucial in today's knowledge economy (Dalkir, 2005). KM practices aim to generate value from intellectual assets, support decision-making, and foster innovation (Darow et al., 2020; Jauhari, Pratihari, 2010). Effective KM systems can access information from multiple sources, centralize it, and continuously improve it for ongoing use (Chitra, 2016). KM is not a management "fad" but a broad, multi-dimensional approach covering most aspects of an enterprise's activities (Wiig, 1997). Successful implementation of KM requires a shift in organizational culture and commitment at all levels to harness knowledge for competitive advantage and innovation (Gupta et al., 2000).

In an enterprise, knowledge is inextricably linked to employees, and its use depends on the organisational culture in which appropriate employee motivation is integrated (Nycz, Owoc, 2006). The literature widely holds the view that the transfer of knowledge resources in an enterprise is influenced by a number of factors. Of these, very important is the organisational climate conducive to knowledge transfer, understood as the role of the organisation and the organisational environment. The key characteristics of an organisational climate conducive to effective knowledge transfer include: a sense of security, clear goals, focus on taking action, support for innovation, freedom (autonomy), challenges, sufficient resources, support from superiors and colleagues, trust and openness, opportunities for debate, etc. (Michalak, Zagórowski, 2017). These issues are numerous, and some researchers divide them into groups, distinguishing, for example, those related to employees, the company and knowledge transfer methods (Paliszkiwicz, 2007). It is also noted that knowledge transfer should be carried out selectively, as not everyone needs specific knowledge at a particular time and place (Krogh, Nonaka, Aben, 2001).

A company's knowledge is shared and distributed among all employees and different groups, but to become productive, it must first be properly coordinated. In the modern enterprise, there is a need for an appropriate knowledge management system, which is defined as a complex mixture of understanding and practice, expressed and tacit knowledge, physical and social technologies (Kłak, 2010). The knowledge management system must take into account different types of knowledge. The distinction between tacit and explicit knowledge is probably the most fundamental concept in knowledge management. Such a distinction was first introduced by Michael Polanyi in the 1960s, but is one of the main points of Nonaka and Takeuchi's book *The Knowledge-Creating Company* (1995). In the book, the authors define tacit knowledge as knowledge embedded in the human mind through experience and work,

know-how and learning embedded in people's minds, and personal wisdom and experience that is context-specific and more difficult to extract and codify. Tacit knowledge includes insights and intuition. Explicit knowledge, on the other hand, is knowledge codified and digitised in books, documents, reports, notes, etc., documented information that can facilitate action. Explicit knowledge is knowledge that can be easily identified, expressed, shared and used. (Nonaka, Takeuchi, 1995; Howelles, 1996). There are two strategies in knowledge management: personalisation and codification. The codification strategy involves recording knowledge in documents, creating organisational knowledge bases and using information systems for management. The personalisation strategy involves focusing on communication and collaboration with experts, which stimulates the transfer of tacit knowledge (Jemielniak, Koźmiński, 2012).

The theory of knowledge management identifies knowledge management processes. Their identification allows a company to systematically transform information, knowledge, skills and competences into intellectual capital. The knowledge management process includes four components: knowledge creation, consolidation, dissemination and protection (Heijst et al., 1998). Knowledge creation is a process carried out through the learning of individuals, including the acquisition of experience, interpersonal communication and group learning. Knowledge consolidation should be understood as the process of collecting and codifying existing knowledge, the aim of which is to bring together knowledge from different sources in a central repository, so that it forms a complete and coherent picture of a given issue. Dissemination of knowledge is very important as its purpose is to ensure that employees have access to the accumulated knowledge, i.e. using the fruits of knowledge codification strategies. The final element is knowledge protection, which aims to safeguard the accumulated knowledge resources against loss or unauthorised use (Kłak, 2010). The steps in the knowledge management process formulated in this way have seen various modifications and developments and are often listed as a lessons-learned concept. However, no matter how many steps are distinguished here and what they are called, it is important for a company to go through them all. This is because only a holistic approach to knowledge management, which is comprehensive and attaches importance to all steps, is able to ensure that 'lessons are learned' and that the company actually benefits from them. An example of a situation where this is necessary is the reorganisation of processes in the area of production logistics in a company.

### **3. Reorganisation of production processes and knowledge management**

One of the moments when new knowledge is created in a company are production reorganisation processes. It is emphasised in the literature that today the functioning of enterprises on the market means continuous improvement both on the production level and in

the aspect of management, and reorganisation or change is now a common and inevitable phenomenon. (Kulińska, Rut, 2015). Production processes, due to the use of advanced technologies and logistics solutions, are today a set of interdependent activities, affecting efficiency, which, according to management theory, is the result of actions taken described by the relation of the obtained effects. (Jucha, Nowacki, 2016) Knowledge management can improve production management and increase a company's competitiveness in the manufacturing industry (Berawi, Woodhead, 2005; Chaithanpaat et al., 2022; Rezaei et al., 2021).

Process reorganisation is not an easy task, as it forces the whole process to be looked at from different angles, from every possible point of view. This results in a constant search for new solutions to achieve the desired result. The most important thing in all of this is outlining the goal, carrying out the actions and activities that will ultimately contribute to success (Topolska, 2017).

Change, therefore, is inevitable and happens all the time. They happen according to different concepts and in different industries. Well-known concepts include those such as radical re-engineering or Lean, for example. They may involve automation or robotisation (Grabowska, 2017), but their main aim is to eliminate waste. Production logistics deserves special attention in reorganisation processes. This is because it is manufacturing that engages the largest part of a manufacturing company's resources while at the same time being a profit-making process (Michlowicz et al., 2015). Hence, it is important that knowledge of the changes taking place in this area permeates the enterprise and is effectively implemented by it.

The literature provides some guidance on the scope and means of integrating knowledge into production management. Muniz et al. propose a model of production management that integrates knowledge management, as a third dimension, to the production and work dimensions and to identify factors that promote a favourable context for knowledge sharing and results achievement in the production operations shop floor environment (Muniz et al., 2010). Bitkowska has investigated the motives of manufacturing companies implementing knowledge management, among which she lists competitive position improvement, better cooperation with customers, staff development and the income and profits growth. (Bitkowska, 2017). Brajer-Marczak examines knowledge management in companies in the context of process management. According to her, the critical element for the distribution of knowledge is the existence of relevant communication channels as well as access to joint databases. The lack of information or hindered access to information may be a serious barrier in solving emerging problems, and sometimes even block process improvement initiatives (Brajer-Marczak, 2016) On the other hand, according to a study conducted in Malaysia, among all knowledge management elements, only knowledge acquisition and knowledge utilisation were still relevant to organisational business performance nowadays, whereas knowledge sharing was perceived to be less important (Loke et al., 2020). Dombrowski et al. studied lean management implementation processes and showed that people's knowledge must undergo the

most fundamental shift in order for the changes to be long-lasting. The majority of implementation methods outline the steps that must be taken in the correct order, but they do not address how knowledge is integrated throughout the company. As such, an analysis of the characterisations of knowledge and knowledge flows is required (Dombrowski et al., 2012). In contrast, a report shows that companies find it difficult to capture and make use of knowledge from external partners (The Economist Intelligence Unit, 2007). Recent studies investigate the association between Knowledge-Management Infrastructure Capability (KMIC), Employee Resilience, Functional-Flexibility (FF), and Innovative Work-Behavior (IWB) in the workplace (Nassani et al., 2024).

Research on the distribution of knowledge in companies is a topical subject, since it is, among other things, knowledge management that determines a company's competitiveness. It is therefore important to study companies from this angle and ask questions about how knowledge is transferred and make recommendations.

#### **4. Research hypotheses and methodology**

The aim of the study was to obtain an answer to the question of how, in the surveyed enterprises, new knowledge, acquired during the production reorganisation process, is integrated into existing know-how and the existing knowledge management system. This study included 5 enterprises from, among others, the clothing, construction and waste processing (recycling) industries, classified as small and medium-sized enterprises, in which production logistics reorganisation processes had recently been carried out.

Interviews were conducted with 13 middle-level and senior managers. Some of the respondents in managerial roles were also company owners. The companies chosen for the study were those that were friends of the authors willing to take part in the study and to which the authors had access. The research sample obtained in this way is called a convenience sample (Glinka, Czakon, 2021; Edgar, Manz, 2017; Galloway, 2005) In two cases, the authors of the study went to the companies, where, according to the method described in the literature, which consists of the researchers - and in this case a consultant - in order to build trust and, above all, to understand the processes and the problem, they go to the location, i.e. to the production halls, the company's headquarters, etc. This allows the consultant to see what technology is being used in the company, what kind of people the team is made up of, what kind of relationships exist within the team and what kind of organisational culture prevails in the company (Jemielniak, Kozminski, 2012).

An individual in-depth interview technique was used, conducted by means of a face-to-face interview; these were partially standardised interviews. The responses were noted down, as the respondents did not agree to be recorded. Some of the responses, considered most



representative, are quoted in this study in brackets. In some cases, the interviewees provided company documentation. The choice of this method was dictated by the purpose of the study: the aim was not only to stick to standardised answers, but also to comment on knowledge management to shed light on its context and draw conclusions. The interviews followed a pre-prepared script, which did not include knowledge management terminology that might have been unfamiliar to the interviewees. The data obtained during the interviews was then anonymised and averaged. The answers to the questions asked were extracted from the texts and the data was aggregated. These were then used for interpretation and conclusions.

The analysis of the literature on the subject allowed the following three research hypotheses to be put forward:

- h1. Of all four elements of the knowledge management process in production logistics reorganisation processes, knowledge transfer and application are the most difficult.
- h2. Of the two existing strategies, the personalisation strategy dominates.
- h3. The integration of new knowledge with existing resources in the production logistics reorganisation process is different if the reorganisation is carried out by a consulting firm and different if it is carried out by company staff.

## **5. Research results and discussion**

### **Knowledge management systems**

In the companies surveyed, the predominant approach is based on a discretionary combination of codification and personalisation strategies. Knowledge is accumulated both in the form of knowledge bases comprising both hard copy and electronic documentation (codification strategy), but is also largely accumulated in the form of individual employee knowledge (personalisation strategy). Codified knowledge has a diffused character. While paper documentation is collected in a highly structured way, there are rooms and shelves assigned to specific binders, electronic documentation is copied and stored on individual employees' computers, which can cause some difficulties. Knowledge is mainly transferred by direct communication: during organisational meetings/conferences, by e-mail or by telephone. There are accounting documents (income and expense ledger, invoices and other expenditure documents, cash documents, fixed asset registers), technical and quality system documents, job instructions, personnel documents, customer cooperation documents (reports, correspondence with customers, offers, notes). Documents from a particular area can be accessed by the employees of the department concerned and by the management. In order to consult a particular document, it is generally necessary to contact a member of staff in the department concerned, who makes it available on request, either by accessing it from the

relevant hard copy repository or by referring to its electronic version (“We actually have all the documents in the computers, sometimes different people have the same document and sometimes we don't know which version was the final one”; “If I need something, I go to B. because she has it and she will always tell me. I know where it is and where the file is, but she has the most insight into it”).

A very important element of the knowledge base is the knowledge dispersed among employees-managers of a non-formalised nature, including tacit knowledge. These are all kinds of notes, scribbles made by employees for the purpose of day-to-day communication (conversations, meetings, negotiations) (‘For example, I have a notebook where I always write down what was said during a meeting. I'm always talking to clients and when we're negotiating, I always write down the figures here, e.g. quantities, prices, to pass it on, it's my notebook’). Direct communication via telephone and face-to-face conversations plays an important role - it is the most common way for employees to pass information to each other. None of the companies surveyed use ERP or CRM computer software. All respondents expressed satisfaction with this system, although reservations were made regarding questionable reliability of face-to-face communication (‘We mostly communicate directly, but if someone doesn't mention something, forgets something, there are problems’).

For production workers, most companies have traditional cork or magnetic boards on which current information is posted. Each production worker undergoes a training process when they are hired. In the majority, this is carried out by foremen. In addition, job instructions are available at the workstations in most of the companies surveyed. A high proportion of tacit knowledge, which employees use in production processes, is rather characteristic here. Managers emphasised that they simply know how to do their job because they have been doing it for many years (‘We just know how to do it, we've been doing it for over 20 years and I don't know how to explain it, we just know how it's supposed to be’).

The companies surveyed use very similar knowledge management strategies. They are aware that there is a whole set of tools to improve this system (e.g. computer systems), but there is a perception that with this scale of production it is not yet necessary to introduce computer systems (“I liked how we switched to the new post office, there are all sorts of other features, like a delivery calendar available to everyone, but I'm not sure it's necessary for us to have anything more complicated”). All respondents rate their companies' existing knowledge management systems as sufficient and satisfactory, while noting some shortcomings, for which, however, the human element is to be blamed (“We have a pretty good communication and workflow system, if something doesn't work sometimes, it's more the people who fail. No computer programme is going to make it better”).

### **Knowledge transfer in production reorganisation processes**

Changes were made to the organisation of production logistics in the companies surveyed. The main reasons came down to the need to improve product quality or product modifications. Each time, the stimulus for the reorganisation came directly from customers who lodged a complaint or made an enquiry about a modified product. Whatever the reason, the reorganisation required changes in the area of production logistics, e.g. changes to the sequence of processes, introduction of new control processes, reorganisation of workplaces, modification of the working methods at a given workplace, changes to the workforce, etc. Thus, new knowledge emerged in the area of production logistics, which had to be integrated into the existing system.

Ratings of the changes introduced in production logistics range from 'minor' to 'quite major' and 'irrelevant' or 'unnecessary' to 'necessary'. Some managers actually initiated them and supported them wholeheartedly ('It was a good thing because we had a bit of chaos here and as much as possible something had to be done about it'), while others expressed attitudes that were not favourable ('Actually I don't know if it was necessary, in my opinion it was all right before'). Nevertheless, they all noted that the emergence of the very concept of change entailed the need for change and were aware that implementation steps had to be taken as the management requested.

The reorganisation in the surveyed companies was carried out in 2 cases by a consulting company, in other cases by the company's employees - middle-level managers, and in one of the companies the changes were directly supervised by the owner. This significantly determined the transfer of information and knowledge in the companies.

In the case of reorganisations carried out by consulting companies, documents - reports, containing a description of the actual state of affairs and recommendations - were produced in the surveyed companies. The task for the enterprises was to implement the recommendations and to subsequently control them.

In the case of reorganisations carried out by company managers, the managers themselves initiated the changes by verbally submitting their proposals to the management and having them approved or modified. They were also responsible for implementing them and controlling their implementation.

It was therefore the middle-level managers (production managers, quality-control managers) who were responsible for implementing the changes. The changes included - depending on the company:

- amending work instructions,
- reorganising workplaces and workstation teams,
- setting up communication routes,
- introducing additional quality controls,

- improving organisational and workflow measures in production halls and warehouses,
- introducing or modifying symbols and markings.

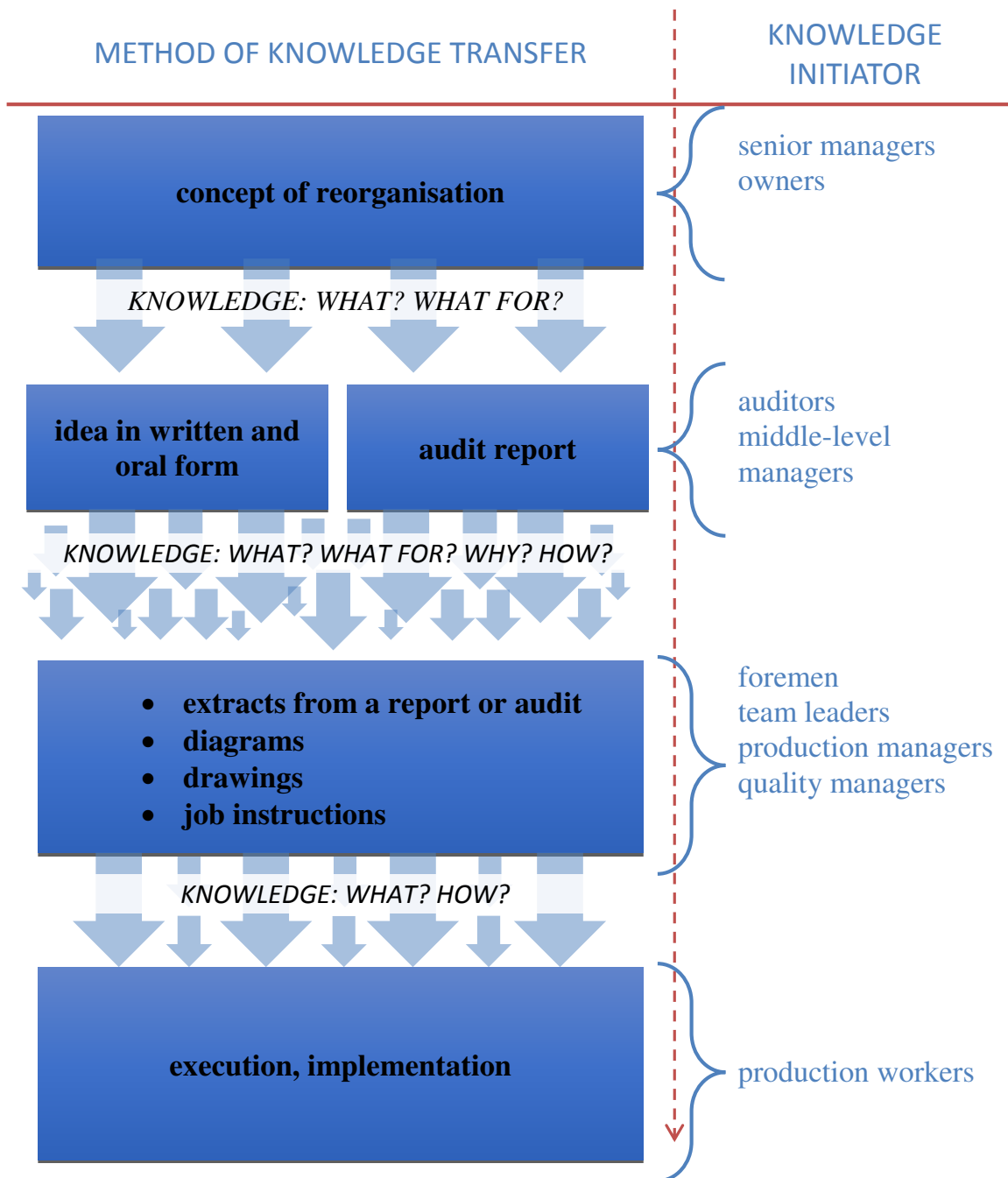
Production workers reacted differently to the changes, depending on who actually initiated the changes. In particular, they feared the changes being carried out by the consulting company, as the announcement of the reorganisation and the presence of people from outside the company, called 'controllers' or 'auditors', made them apprehensive about the termination of their employment contracts. Some production workers welcomed the proposed changes. Most understood the need for change.

The most difficult thing to assess is the effectiveness of the changes made. In the interviews conducted, managers found it difficult to separate their account of the implementation of the reorganisation from their subjective evaluation of it, which may not be surprising as they often evaluated the effectiveness of their own actions. Nevertheless, it can be concluded that the implementation of the reorganisation of production processes in the surveyed companies followed a certain model as illustrated in Fig. 1.

Above all, the companies were successful in transferring new knowledge into their existing knowledge bases. In the two companies that used external assistance, reorganisation documentation was integrated into the company documentation. The reports were not just 'put away on a shelf', but job instructions and procedure descriptions were modified or created altogether. Knowledge was codified and appropriate documentation was created. However, this knowledge was not internalised in individual production employees. A kind of sieve effect developed, or rather multiple mash sieves of a varying mesh size, through which knowledge passes from the top to the lowest level in the organisation. Employees know that a reorganisation has taken place, but it does happen at times that they do not follow the new instructions.

Production workers best absorbed the knowledge passed on to them by their immediate superiors and such knowledge, obtained through direct contact, they appeared to internalise best. For example, in one company, a change in the production process (additional quality control of the product on an additional piece of equipment at a certain stage of its manufacture) was recorded in the workstation manual located at the workstation and, in addition, the employees were informed of the new step. However, the instruction was in such a small font that it was not visible from where the stand was operated. And yet, the workers complied with the new instruction because they had been instructed what to do by their superiors.

New production expertise was not transferred in its entirety and, most importantly, the companies surveyed encountered difficulties in implementing it. The factors that caused these difficulties came from two directions: from the production staff - in the case of reorganisation carried out by the company's employees - and as early as the middle-level management. The reasons can be identified as unwillingness or inability to learn, lack of confidence, but also a desire to avoid risks ('I think our people are a bit poorly motivated, I don't think they know the need, they don't have the drive').



**Figure 1.** Diagram of the transfer of the knowledge management process in production logistics reorganisation processes.

Source: authors' own elaboration.

Another group of reasons is the obstacles arising from the organisation itself: too rigid organisational framework, unclear division of tasks and organisational structures, lack of flexibility and rigidity of thinking, attachment to old patterns of behaviour.

The new knowledge acquired by the surveyed companies was, as already mentioned, absorbed by them through codification and personalisation. The changes made to the documentation available to employees are those made available in the form of executed or

updated workstation manuals. The remaining knowledge was provided to employees in the form of one-off training sessions. None of the companies carried out a re-inspection in order to check that employees were following the new guidance. Thus, only from the accounts of the interviewees and based on their assessment can it be concluded whether the knowledge transfer was effective. Managers were overwhelmingly sceptical here in the interviews, frankly admitting that knowledge transfer is unsatisfactory. While new knowledge is available to employees, it is still not used by them. This indicates that companies perceive knowledge as something that is disconnected from practice. Where new recommendations and guidelines are applied in production, this is as a result of the training provided.

It is worth noting, however, that in one case the knowledge transfer was successful. This concerns the extension of a new production line in a recycling company. In this company, process and technology knowledge is protected by patents. In this case, the extension of the new line involved obtaining a new patent, which was an extremely strong motivation for the owner to take care of putting the patented expertise into practice. In this way, the launch of the new line became a priority, with the owner of the company personally overseeing the project.

The study presented here has some limitations. It could certainly be extended to include other types of enterprises and the changes made to them. Further on, such a study could include more enterprises, which would provide a basis for generalising the findings and abstracting more universal patterns or even a model. Further research could certainly ask questions about where the barriers to knowledge transfer in manufacturing enterprises come from and how they can be overcome.

## 6. Conclusions

The study confirmed all three hypotheses formulated in the introduction.

Of these four elements of the knowledge management process in production logistics reorganisation processes, knowledge transfer and application (h1) proved to be the most difficult. It seems that in order for the implementation of new knowledge to be successful, it is necessary to involve employees and motivate them appropriately. In the case where the owner was directly involved in the process, the transfer was successful, which can be explained by the full motivation and commitment of the owner resulting from his personality traits as well as his strong motivation to develop his own company. In other cases, care would have to be taken to ensure that employees were properly motivated. Perhaps this could be achieved using a system of bonuses or considering other incentive systems for employees.

The hypothesis that, of the two existing strategies, the personalisation strategy (h2) dominates was also positively verified. The companies under study used two learning scenarios mixing both strategies: personalisation and codification, but the personalisation strategy

prevailed. The culture of knowledge retention in companies is primarily based on employee knowledge and this is largely tacit knowledge. It is difficult for employees to share it, as they do not have any developed methods for sharing knowledge, they do it rather spontaneously and without a specific methodology. The same is true for transferred new knowledge: those responsible for implementation preferred to transfer knowledge directly, but this was not always done in a systematic and effective way.

It was also possible to verify the last hypothesis, according to which the integration of new knowledge with existing resources in the reorganisation process of production logistics proceeds differently if the reorganisation is carried out by a consulting company and differently if it is carried out by the company's employees (h3). Two of the surveyed companies implemented the reorganisation with the help of consulting companies. It was in these companies that knowledge transfer was less successful. The reasons for this are mainly that employees in companies where the reorganisation was carried out by managers appeared to be more motivated and more convinced by the process.

Knowledge transfer in companies undergoing reorganisation in the area of production logistics is a process consisting of four stages: creation, consolidation, dissemination and protection of knowledge and involves all employees: from owners or senior managers to production employees. The study shows that the least effective stage is the dissemination (transfer) of knowledge to the lowest levels, i.e. to production employees. Knowledge in enterprises is subject to codification and personalisation; in this respect, enterprises follow a mixed strategy. The biggest problem is precisely the internalisation of knowledge at the lowest levels by employees in individual workplaces. This would include the use of teaching strategies and methods used by middle-level managers as well as a training and verification system.

## References

1. Berawi, M.A., Woodhead, R.M. (2005). Application of knowledge management in production management. *Human Factors and Ergonomics in Manufacturing & Service Industries*, 15(3), 249-257. Retrieved from <https://doi.org/10.1002/hfm.20024>
2. Bitkowska, A. (2017). Knowledge management in production enterprises. *Production Engineering Archives*, 15(15), 23-26.
3. Brajer-Marczak, R. (2016). Elements of knowledge management in the improvement of business processes. *Management*, 20(2), 242-260.
4. Chaithanapat, P., Punnakitikashem, P., Khin Khin Oo, N.C., Rakthin, S. (2022). Relationships among knowledge-oriented leadership, customer knowledge management, innovation quality and firm performance in SMEs. *Journal of Innovation & Knowledge*, 7(1), 100162.

5. Dalkir, K. (2005). *Knowledge Management in Theory and Practice*. London: Routledge.
6. Dombrowski, U., Mielke, T., Engel, C. (2012). Knowledge management in lean production systems. *Procedia CIRP*, 3(1), 436-441.
7. Drucker, P. (1996). The information executives truly need. *Harvard Business Review*, January-February.
8. Edgar, T.W., Manz, D.O. (2017). Exploratory Study. *Research Methods for Cyber Security*, 95-130.
9. Galloway, A. (2005). Non-Probability Sampling. *Encyclopedia of Social Measurement, Three-Volume Set*, 2, 859-864.
10. Glinka, B., Czakon, W. (2021). *Podstawy badań jakościowych*. Warszawa: PWE.
11. Grabowska, S. (2017). Reengineering procesu w przedsiębiorstwie przemysłowym. *Zeszyty Naukowe Politechniki Śląskiej, Seria: Organizacja i zarządzanie, Vol. 114, Iss. 1993*.
12. Gupta, B., Iyer, L.S., Aronson, J.E. (2000). Knowledge management: Practices and challenges'. *Industrial Management and Data Systems, Vol. 100(1)*, pp. 17-21.
13. Heijst, G. van, Spek, R. van der, Kruizinga, E. (1998). The Lessons Learned Cycle. In: U.M. Borghoff, R. Pareschi (Eds.), *Information Technology for Knowledge Management*. Berlin/Heidelberg: Springer.
14. Howells, J. (1996). Tacit Knowledge, Innovation and Technology Transfer. *Technology Analysis & Strategic Management, Vol. 8, Iss. 2*, p. 91.
15. Jemielniak, D., Koźmiński, A.K. (2012). *Zarządzanie wiedzą*. Warszawa: Wolters Kluwer, pp. 60-61.
16. Jucha, S., Nowacki, K. (2016). *Optymalizacja procesów produkcyjnych za pomocą narzędzi cyfrowych*. Polskie Towarzystwo Zarządzania Produkcją. Available at: [www.ptzp.org.pl](http://www.ptzp.org.pl).
17. Kłak, M. (2010). *Zarządzanie wiedzą we współczesnym przedsiębiorstwie*. Kielce: Kieleckie Towarzystwo Edukacji Ekonomicznej, p. 38.
18. Koźmiński, A. (2005). *Zarządzanie w warunkach niepewności. Podręcznik dla zaawansowanych*. Warszawa: PWN.
19. Krogh, G., Nonaka, I., Aben, M. (2001). Making the Most of Your Company's Knowledge: A Strategic Framework. *Long Range Planning, Vol. 4*, p. 425.
20. Kulińska, E., Rut, J. (2015). Organizacja i reorganizacja procesów produkcyjnych na przykładzie badanych przedsiębiorstw. *Logistyka, Vol. 4*.
21. Loke, W.K., Fakhroazi, A., Doktoralina, C.M., Lim, F.W. (2020). The zeitgeist of knowledge management in this millennium: Does KM elements still matter in nowadays firm performance? *Management Science Letters, 10(13)*, 2127-2134.
22. Mavlioutov, R., Belyaev, M., Borisova, K. (2020). Reengineering of manufacturing processes in the construction organization. *IOP Conf. Ser.: Mater. Sci. Eng.* 890, 012120.



23. Michalak, A., Zagórowski J. (2017). Uwarunkowania transferu zasobów wiedzy w przedsiębiorstwie. *Zeszyty Naukowe Politechniki Śląskiej, seria: Organizacja i zarządzanie, Vol. 1972*, p. 299.
24. Michłowicz, E., Smolińska, K., Zwolińska, B. (2015). Logistics engineering in a production company. *Research in Logistics & Production, Vol. 5*.
25. Muniz, J., Dias Batista, E., Loureiro, G. (2010). Knowledge based integrated production management model. *Journal of Knowledge Management, 14(6)*, 858-871.
26. Nassani, A.A., Al-Aiban, K.M., Rosak-Szyrocka, J., Yousaf, Z., Isac, N., Badshah, W. (2024). Knowledge management infrastructure capabilities towards innovative work behavior: Employee's resilience and role of functional flexibility. *Heliyon, 10(20)*, e38742.
27. Nonaka, I., Takeuchi, H. (1995). *The Knowledge-Creating Company*. New York, Oxford: Oxford University Press.
28. Nycz, M., Owoc, M. (2006). *Pozyskiwanie wiedzy i zarządzanie wiedzą*. Wrocław: Akademia Ekonomiczna, p. 180.
29. Paliszkiewicz, J. (2007). Transfer wiedzy a organizacyjna kreatywność. *Przegląd Organizacji, Vol. 2*, p. 15.
30. Stankiewicz, M.J. (2006). Próba modelowania procesów zarządzania konkurencyjnym potencjałem wiedzy w polskich przedsiębiorstwach. In: M.J. Stankiewicz (Ed.), *Zarządzanie wiedzą jako kluczowy czynnik międzynarodowej konkurencyjności przedsiębiorstwa*. Toruń: Dom Organizatora.
31. The Economist Intelligence Unit (2007). *Knowledge management in manufacturing. A report from the Economist Intelligence Unit Sponsored by Siemens UGS PLM Software*, 21.
32. Topolska, K. (2017). Modelowanie wydajności stanowisk roboczych w cyklach produkcyjnych. *Logistyka, Vol. 12*, p. 1645.



## **SYMPTOMS OF OCCUPATIONAL BURNOUT IN WOMEN AFFECTED BY DOMESTIC VIOLENCE**

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**Purpose:** The purpose of this article was to study the prevalence of burnout symptoms and their determinants in a group of women experiencing domestic violence.

**Design/methodology/approach:** The study included 69 women who reported experiencing domestic violence. All of the subjects were working professionally at the time of the survey. The research was cross-sectional in nature. The study used a self-designed survey and the Maslach Burnout Inventory (MBI).

**Findings:** The results revealed that the largest number of female respondents showed high severity of symptoms of occupational burnout in the scope of emotional exhaustion and low severity of symptoms in the scope of depersonalization and personal accomplishment. The scores concerning emotional exhaustion were higher in women who were older, had longer job tenure, vocational education, and declared experience of physical violence.

**Practical implications:** The research findings presented here underscore the need for complex workplace measures to recognize the problem and intervene based on education, skills training and instrumental support. These measures are relevant not only to the employee who is a victim of domestic violence, but also to the workplace from the point of view of organizational performance.

**Originality/value:** The study fills a research gap that concerns the relationship between the experience of domestic violence and the risk of developing symptoms of burnout exactly in the group of Polish women who work.

**Keywords:** domestic violence, occupational burnout, emotional exhaustion.

**Category of the paper:** Research paper.

## 1. Introduction

Domestic violence is a widespread problem throughout the world, including Poland. According to police reports, in 2023 the number of people experiencing domestic violence in Poland was: 51,631 women and 9,162 men<sup>1</sup>. At the same time, it should be stressed that these statistics probably do not reflect the true scale of the problem, if only because victims of violence often do not come forward for help. There is also a noticeable disparity in that women are more often victims than men. In addition, in cases of domestic violence, children are always the victims as well, even if they only witness a parent or another loved one being abused. The problem with estimating the scale of the phenomenon can also be in properly defining its essence, thereby recognizing and categorizing the behavior in question as violent. There are many definitions of the phenomenon of domestic violence in the literature, and there is no clear position among authors on its characteristics (Czarkowska, 2014). One of the references used is the definition contained within the legal solutions included in the Act on the Prevention of Domestic Violence of 29 July 2005, where domestic violence is understood as: *a single or repeated intentional act or omission, using a physical, mental or economic advantage, violating the rights or personal interests of a person suffering domestic violence, in particular:*

- a) *exposing that person to the risk of losing their life, health or property,*
- b) *violating their dignity, bodily integrity or freedom, including sexual freedom,*
- c) *causing damage to their physical or mental health, causing them suffering or harm,*
- d) *limiting or depriving that person of access to financial resources or the ability to work or become financially independent,*
- e) *significantly invading the privacy of that person or causing them to feel threatened, humiliated or anguished, including those undertaken by means of electronic communication.*

The consequences of domestic violence can be considered from an individual or social point of view. It is a fact that the effects of domestic violence generate significant public costs. These are the costs of work of various institutions, including the police, social services, intervention centers, as well as the costs of involvement of the justice system or the provision of basic and specialized health care services (Łukowska, 2018). In Poland, the estimated cost of violence is 31.2 billion euros per year (Polish Commissioner for Human Rights, 2023). In contrast, the estimated annual cost of gender violence in the European Union is 366 billion euros. In turn, although the consequences experienced by each individual victim cannot be accurately estimated, they are certainly extremely severe, often leading to chronic issues with mental and/or physical health. This includes the victim's functioning within the society, including at work.

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<sup>1</sup> According to the data taken from: <https://statystyka.policja.pl/st/wybrane-statystyki/przemoc-w-rodzinie/201373,Prze-moc-w-rodzinie-dane-od-2012-roku.html>, 4.09.2024.

The article attempts to analyze the professional functioning of women experiencing domestic violence by assessing the presence of occupational burnout symptoms. In addition, the relationships between burnout symptoms and with selected variables were examined. The summary also indicates directions for interventions that can be used against the discussed problems in the work environment.

## 2. Literature Review and Research Background

The experience of domestic violence leads to a negative impact on the victim's work as a result of the direct acts of the perpetrator interfering with the victim's functioning at work, but also due to the indirect effect - the deterioration of the victim's psychophysical well-being, thus affecting the quality of their work. Swanberg, Logan and Macke (2005; 2006) divide the tactics used by perpetrators that directly affect victims' employment and job opportunities into three categories:

- sabotage - includes acts taken by the perpetrator to stop the victim from going to work or cause them to be late, such as hiding car keys,
- stalking - refers to acts designed to make the victim feel threatened during work time, such as waiting for the victim outside their workplace,
- on-the-job harassment - includes behavior that directly interferes with the victim's work, such as calling the victim when they are at work or harassing them at their workplace.

In turn, the indirect impact is the the consequences of the violence experienced, which manifest themselves in mental and/or physical health. The somatic complaints that may be related to the experience of violence include: migraines (Campbell et al., 2018), chronic pain (Loxton et al., 2017), gastrointestinal problems, and gynecological problems (Gibson et al., 2019; Karakurt et al., 2017), among others. It is likely that the mechanism that leads to somatic health disorders has to do with chronic stress and thus weakened immune system function. It is also possible that the impact of the victim's lifestyle is not conducive to maintaining health (e.g. smoking, unhealthy diet) (Campbell, 2002). As a result of these ailments, the employee will be more likely to be indisposed to do their job, more likely to be absent from work due to being on sick leave, distractions, mistakes, accidents at work, or presenteeism. Studies also confirm the increased prevalence of mental health disorders resulting from violence (Ahmadabadi, 2020; Baker et al., 2021; Brown et al., 2020; Campbell, 2002; Campbell et al., 2002; Charak et al., 2020; Daugherty et al., 2021; Gibbs et al., 2018;). A systematic review based on quantitative studies from 2012-2020 on women's exposure to intimate partner violence revealed that the most frequently indicated mental health outcomes were depression (70% of all the studies), PTSD (29%), and anxiety (17%) (White et al., 2024). Similar results are indicated in another systematic review based on 58 studies mostly from the United States,

which revealed associations between intimate partner violence experiences and depression, PTSD and anxiety (Lagdon, Armour, Stringer, 2014). The aforementioned consequences - marked deterioration of the mental condition of a violence victim - may cause disruptions at work, including impaired attention and memory, increased reaction time, increased risk of workplace accidents, disrupted relationships with colleagues/supervisors, increased absenteeism or presenteeism. Studies across cultures confirm the negative impact of domestic violence on the ability to work. In a study conducted by the Australian Domestic Violence Rights and Entitlements Project (McFerran, 2011) involving 3,611 participants from six different employment organizations and unions, among the respondents who reported experiencing domestic violence almost half reported that their ability to get to work was affected. In addition, these respondents declared the impact of violence on work performance: 16% indicated feeling distracted, tired or unwell, 7% reported being late for work, while 10% of participants reported having to take time off due to domestic violence.

Another possible consequence of domestic violence that can manifest itself in the work environment is an increased risk of occupational burnout. Although the occupational burnout syndrome has been studied by researchers for many years, there is no uniform, universally accepted definition of this phenomenon. Maslach, who has spent many years analyzing occupational burnout, describes the phenomenon multidimensionally, pointing to its 3 main components: emotional exhaustion (a sense of emotional overload, lack of support, helplessness, discouragement at work, reduced activity, pessimism, irritability), depersonalization (reacting negatively to others, indifference and distancing oneself from the problems of others), and reduced sense of personal achievement/personal accomplishment (a sense of lack of competence, lack of conviction about the possibility of achieving success in working with people, negative self-esteem, loss of confidence in one's own abilities) (Maslach, 1998).

Empirical work involving health care workers who have experienced violence at work confirms a higher exposure to development of burnout symptoms in the groups of workers studied (Alameddine et al., 2011; Estryng-Behar et al., 2008; Martínez-Jarreta et al., 2007; Moreno Jiménez et al., 2005). However, there is still a lack of research specifically into the employees who are victims of domestic violence. In contrast, it seems likely that they are also at risk of occupational burnout because, among others, they experience such emotional consequences as depression, anxiety, etc., which in turn are predictors of burnout (Sabbah et al., 2012). Therefore, this article attempts to answer the following research question:

*What is the severity of burnout symptoms (based on Maslach's three-dimensional model) in the employees who experience domestic violence?*

In addition, an attempt was made to analyze selected determinants of the incidence of burnout symptoms, such as age, length of service, education and type(s) of violence experienced.

### 3. Methodology of the research

#### 3.1. Participants

The research was conducted among a group of women who received assistance from a center that helps victims of domestic violence, located in the province of Silesia. The research was conducted in April-May 2024. The criterion of selection for the study was declaration of experience of domestic violence (psychological/physical/sexual/economic) while the person has been working for at least 3 years. Women who gave informed consent to the study were given a set of paper-and-pencil sheets to fill out. Of the women who consented to the study, 69 returned the completed sheets (8 women did not return the sheets, 3 did not complete all the sheets), aged 22 to 56 ( $M = 43.72$ ;  $SD = 10.23$ ). Detailed characteristics of the study group are shown in Table 1.

**Table 1.**  
*Characteristics of the Study Group*

|                              |            | <b>M</b> | <b>SD</b> |
|------------------------------|------------|----------|-----------|
| Age (years)                  |            | 43.72    | 10.23     |
| Length of service (years)    |            | 18,48    | 9,6       |
|                              |            |          |           |
|                              |            | <b>n</b> | <b>%</b>  |
| Education                    | higher     | 42       | 60,87     |
|                              | secondary  | 18       | 26,09     |
|                              | vocational | 9        | 13,04     |
|                              |            |          |           |
| Type of violence experienced | mental     | 69       | 100       |
|                              | physical   | 41       | 59,42     |
|                              | sexual     | 12       | 17,39     |
|                              | economic   | 9        | 13,04     |

#### 3.2. Measures

The study used the Maslach Burnout Inventory (MBI), a tool used commonly that for measuring three dimensions of occupational burnout (emotional exhaustion - EE, depersonalization - D, personal accomplishment - PA) (Pasikowski, 2000). The questionnaire consists of 22 questions - 9 deal with emotional exhaustion, 5 with depersonalization, and 8 with personal accomplishment. High levels of burnout are evidenced by high scores on the EE and D scales and low scores on the PA scale. Scores should be calculated separately for each subscale. The reliability coefficients of the Polish version of the questionnaire assessed using data from nurses' surveys were, respectively: EE -  $\alpha = 0.79$ ; D -  $\alpha = 0.56$ ; PA -  $\alpha = 0.72$ . Table 2 shows the Maslach Burnout Inventory scoring guide. In addition, the study used a questionnaire prepared by the authors of this paper, which takes into account the following data: age, education, length of service and type(s) of violence experienced (psychological/physical/sexual/economic).

**Table 2.**  
*Maslach Burnout Inventory (MBI) scoring guide*

| Burnout level | Dimensions of occupational burnout |     |       |
|---------------|------------------------------------|-----|-------|
|               | EE                                 | D   | PA    |
| high          | >27                                | >10 | 0-33  |
| moderate      | 19-26                              | 6-9 | 34-39 |
| low           | 0-18                               | 0-5 | >40   |

Source: Maslach, Jackson, Leiter, Schaufeli, Schwab, 1986.

### 3.3. Data Analysis

The study was cross-sectional in nature. It included statistical analysis using the STATISTICA 13.3 program by Statsoft. Non-parametric tests (assumption of normality of distribution not met) for independent groups (Mann-Whitney test and Kruskal-Wallis H test) and Spearman rank correlations were used for determining the relationship between symptoms of burnout and variables describing the study group. A statistical significance level of  $p < 0.05$  was adopted. The severity of burnout symptoms (in three dimensions) was determined by calculating the means and standard deviations.

## 4. Results

Table 3 shows the results of examining the severity of burnout symptoms in each dimension.

**Table 3.**  
*Severity of burnout symptoms in the studied group of women*

| Value of each dimension of the MBI scale                    |          | M     | SD    |
|---|----------|-------|-------|
| EE  |          | 22,01 | 12,24 |
| D   |          | 4,87  | 3,5   |
| PA  |          | 37,62 | 7,3   |
| Symptom severity levels for each dimension of the MBI scale |          | N     | %     |
| EE  | high     | 36    | 52,17 |
|   | moderate | 15    | 21,74 |
|   | low      | 18    | 26,09 |
| D   | high     | 6     | 8,7   |
|   | moderate | 21    | 30,43 |
|   | low      | 42    | 60,87 |
| PA  | high     | 9     | 13,04 |
|   | moderate | 26    | 37,68 |
|   | low      | 34    | 49,28 |

M - mean, SD - standard deviation.

An analysis of the results obtained in terms of mean values of each dimension indicates medium symptom severity in the EE and PA dimensions, while low severity (but at the upper limit) in the D dimension. However, considering the levels of symptom severity in each dimension, it should be noted that in the EE dimension, high symptom severity was shown by



the largest number of subjects (52.17%), while in the other dimensions, the largest number of subjects obtained low levels of symptoms (60.87% in the D dimension and 49.28% in the PA dimension, respectively).

The following tables: 4, 5, 6, 7, present an analysis of burnout symptoms in each dimension according to selected variables characterizing the study group (age, education, length of service, type(s) of violence experienced).

**Table 4.**

*Relationship between symptoms of occupational burnout and age of respondents*

| MBI scale dimensions | Spearman's Rho | <i>p</i>     |
|----------------------|----------------|--------------|
| EE                   | <b>0,27</b>    | <b>0,026</b> |
| D                    | 0,13           | 0,283        |
| PA                   | -0,05          | 0,690        |

p - level of significance.

The results show a positive statistically significant relationship ( $p = 0.026$ ) between the age of the subjects and the EE dimension of occupational burnout, meaning that the older the subjects, the higher the severity of the EE symptoms. The other dimensions of occupational burnout were found to have no statistically significant correlation with the age of the women studied.

**Table 5.**

*Relationship between symptoms of occupational burnout and length of service of the respondents*

| MBI scale dimensions | Spearman's Rho | <i>p</i>     |
|----------------------|----------------|--------------|
| EE                   | <b>0,27</b>    | <b>0,023</b> |
| D                    | 0,09           | 0,483        |
| PA                   | -0,131         | 0,282        |

p - level of significance.

Just like in the case of age, length of service was found to show a positive statistical relationship ( $p = 0.023$ ) with the EE dimension of occupational burnout, meaning that the longer the length of service of the subjects, the higher the severity of EE symptoms. The other dimensions of occupational burnout were found to have no statistically significant correlation with the length of service of the women studied.

**Table 6.**

*Comparison of mean values of symptoms of occupational burnout compared with the level of education of the respondents*

| MBI scale dimensions | Education |       |       |     |           |       |       |    |            |      |       |    | H            | <i>p</i>     |
|----------------------|-----------|-------|-------|-----|-----------|-------|-------|----|------------|------|-------|----|--------------|--------------|
|                      | higher    |       |       |     | secondary |       |       |    | vocational |      |       |    |              |              |
|                      | M         | SD    | Q1-Q3 | Me  | M         | SD    | Q1-Q3 | Me | M          | SD   | Q1-Q3 | Me |              |              |
| EE                   | 22,08     | 12,38 | 5-32  | 27  | 17,55     | 12,89 | 4-29  | 21 | 30,89      | 4,57 | 28-35 | 32 | <b>8,373</b> | <b>0,015</b> |
| D                    | 5,19      | 3,67  | 2-8   | 4,5 | 3,78      | 2,86  | 2-5   | 3  | 5,55       | 3,91 | 3-8   | 4  | 2,236        | 0,327        |
| PA                   | 37,67     | 7,78  | 37-42 | 40  | 37,28     | 7,58  | 36-42 | 38 | 38,11      | 5,11 | 35-42 | 39 | 0,366        | 0,833        |

M - mean, SD - standard deviation, Q1 - first quartile, Q3 - third quartile, Me - median H - Kruskal-Wallis statistical test, p - level of significance.

A comparison of the mean values of the dimensions of occupational burnout by educational category revealed one statistically significant difference ( $p = 0.015$ ) in EE symptoms. The additional multiple comparison of mean ranges for all the samples revealed that the respondents with vocational education presented higher severity of the EE dimension symptoms compared to respondents with secondary education.

**Table 7.**

*Comparison of mean values of symptoms of occupational burnout compared with the experience of the respective types of violence*

|          |     | MBI scale dimensions |       |       |       |      |      |       |       |       |      |       |       |
|----------|-----|----------------------|-------|-------|-------|------|------|-------|-------|-------|------|-------|-------|
|          |     | EE                   |       |       |       | D    |      |       |       | PA    |      |       |       |
| Violence |     | M                    | SD    | U     | p     | M    | SD   | U     | p     | M     | SD   | U     | p     |
| physical | yes | 25,81                | 10,58 | 307,5 | 0,001 | 5,57 | 3,86 | 423,5 | 0,079 | 36,98 | 7,56 | 454,5 | 0,168 |
|          | no  | 16,11                | 12,71 |       |       | 3,78 | 2,62 |       |       | 38,62 | 7,02 |       |       |
| sexual   | yes | 22,02                | 12,07 | 340,5 | 0,724 | 5,61 | 4,17 | 320,5 | 0,509 | 35,76 | 7,44 | 271,0 | 0,156 |
|          | no  | 22,00                | 13,92 |       |       | 4,69 | 3,37 |       |       | 38,05 | 7,33 |       |       |
| economic | yes | 21,89                | 11,84 | 249,5 | 0,721 | 6,44 | 3,71 | 188,5 | 0,149 | 34,00 | 9,03 | 177,5 | 0,101 |
|          | no  | 22,03                | 12,5  |       |       | 4,63 | 3,46 |       |       | 38,17 | 6,99 |       |       |

M - mean, SD - standard deviation, U - value of the Mann-Whitney test, p - level of significance.

A comparison of the mean values of the respective dimensions of burnout by type of experienced violence was carried out for physical, sexual and economic violence, as all of the women studied reported experiencing psychological violence. The results revealed one statistically significant difference ( $p = 0.001$ ) in the scope of the EE dimension of occupational burnout between women experiencing and not experiencing physical violence - the severity of symptoms of this dimension was higher in women who had experienced such violence.

In addition, in order to see if there is a difference in the severity of symptoms in women who had experienced only psychological violence and in those women who had suffered another form of violence in addition to psychological violence, a comparison of the mean values in each dimension in terms of the two categories mentioned was carried out. The detailed results are presented in Table 8.

**Table 8.**

*Comparison of mean values of occupational burnout symptoms in a group of women experiencing psychological violence and those who also had experienced other types of violence*

| MBI scale dimensions | Only psychological violence |       | Psychological and other types of violence |       | U     | p     |
|----------------------|-----------------------------|-------|---|-------|-------|-------|
|                      | M                           | SD    | M   | SD    |       |       |
| EE                   | 17,71                       | 12,58 | 23,89                                     | 11,86 | 346,5 | 0,041 |
| D                    | 3,66                        | 2,78  | 5,39                                      | 3,70  | 374   | 0,091 |
| PA                   | 39,19                       | 6,76  | 36,94                                     | 7,56  | 376,5 | 0,098 |

M - mean, SD - standard deviation, U - value of the Mann-Whitney test, p - level of significance.

The results revealed one statistically significant difference ( $p = 0.041$ ) in terms of the symptoms of the EE dimension, where the scores of women who had experienced other type(s) of violence in addition to psychological violence, were higher than the scores of women who reported only experiencing psychological violence.

## 5. Discussion

To answer the research question posed, an analysis of the severity of symptoms of occupational burnout in the study group of women was carried out, as well as an analysis of selected determinants of these symptoms. The results indicate medium (EE, PA dimensions) and low (D dimension) scores for severity of the occupational burnout symptoms. However, a careful distribution in terms of levels of symptom severity (Maslach Burnout Inventory scoring guide) revealed that the largest number of subjects (52.17%) indicated high severity in the EE dimension, while in the D and PA dimensions, the largest number of subjects indicated low severity (60.87% and 49.28%, respectively). Thus, the EE dimension proved to be the most severe symptom of occupational burnout in the study group of women. This means that these women are more likely to experience: excessive fatigue, a sense of loss of energy, lack of enthusiasm for action, the need to put more effort into work, discouragement, dissatisfaction, internal tension, fluctuating between anxiety and irritability (Majkowska, 2021). In an attempt to explain the result obtained, it is worth noting that the EE dimension of occupational burnout is said to be the core component of burnout and its most obvious manifestation (Klusman et al., 2021; Maslach, Schaufeli, Leiter, 2001). EE has become the best indicator of burnout (Piko, 2006; Schaufeli, Van Dierendonck, 1993), which contributes to the situation where some researchers measure occupational burnout based only on the EE dimension (Kristensen et al., 2005). Importantly, the EE dimension is also the one most frequently felt and is the first sign of burnout (Gam, Kim, Jeon, 2016). This may confirm the higher risk of developing burnout in the group of women experiencing violence, which is mainly manifested by EE symptoms. However, it should also be noted that the symptoms of the EE dimension are non-specific (Hillert, 2024). The symptoms that make up that dimension; including lack of energy, permanent fatigue, discouragement, pessimism, may be related to a diagnosis with a different etiology, such as depression or anxiety disorders. For example, in a study by Bakker et al. (2000), EE correlated more strongly with depressive symptoms than with the other components of burnout. This result may therefore be related to other emotional disorders of the women studied, which is likely, among others, due to the greater co-occurrence of mental health problems in this group of women. An accurate differential assessment of the etiology of EE dimension symptoms would require a detailed diagnosis of the subjects for the presence of other mental health problems, which could provide a springboard for future research.

The importance of the EE dimension is also underscored by the results of a study of selected determinants (age, length of service, level of education, type of violence experienced) of burnout symptoms. The analysis revealed statistically significant relationships only between the variables studied and the EE dimension. Being older, having longer job tenure, vocational education (compared to high school education) and experience of physical violence, appeared to be related to increased EE dimension scores.

The existing studies in the literature on the relationship between age and occupational burnout are not consistent. Some studies indicate a negative relationship between the indicated variables (Marchand et al., 2015; Norlund et al., 2010), some indicate a bimodal relationship, where both older and younger workers' scores are elevated (Cheng et al., 2013), while others confirm a positive relationship (Lindblom et al., 2006; Verdonk et al., 2010). In a study by Lindblom et al. (2006), the highest rate of work-related fatigue was revealed among women aged 50-64, and similarly, in a study by Ahola et al. (2006), women aged >50 reported symptoms of severe occupational burnout more often than other workers. In the present study, the average age of the women was 43, but it is possible that the co-occurrence of psychological strain from experiencing violence intensifies the feeling of emotional exhaustion. These women's energy resources are depleted faster as a result of the stress experienced both at home and at work. In addition, they do not have the ability to buffer the tension at work through supporting home conditions, which in the long run can promote fatigue, discouragement, and loss of energy (Montgomery et al., 2003; Peeters et al., 2005). Moreover, as a result of the mechanism of over-responsibility for the family's livelihood situation, these women very often take up professional activities even beyond their capabilities, working long and intensively (Siudem, 2013). It is worth noting that the average length of service of the women studied (18 years) suggests a relatively intensive level of professional activity in the study group. At the same time, the result on the relationship between length of service and the EE dimension seems to relate to the relationship in question, since greater length of service will most often be found in older women and can be interpreted by analogy. In conclusion, it can be stated that women experiencing domestic violence who are older and who are engaged in intensive work activity for a long period of time, will be more likely to experience these symptoms of occupational burnout, which are expressed in emotional exhaustion, loss of energy or discouragement from work.

The study also revealed that the severity of the EE dimension symptoms is differentiated by the level of education - women with vocational education revealed higher severity of EE dimension symptoms compared to the respondents with secondary education. What is also significant is that the difference is only in the EE dimension. Women with vocational education are more likely to engage in work that involves physical exertion, which puts a significant strain on their energy resources and, in the long run, may be conducive to higher scores of elevated fatigue and energy loss. This is supported by the results of a number of other studies that look at the relationship between education and the level of occupational

burnout that reveal a difference only or mainly in the EE dimension (Embich, 2001; Kroupis et al., 2017; de Paiva et al., 2017; Şen, 2023). An analogous result of the EE dimension was obtained by Şen (2023), where the level of symptoms in the group of special education teachers was higher in people with postgraduate degrees than in those with undergraduate degrees, or also Kroupis et al. (2017), where among PE teachers, it was the primary school PE teachers that exhibited much higher scores compared to secondary school teachers. In contrast, in Embich's (2001) study, the level of special education preparation contributed significantly to teachers' feelings of emotional exhaustion - as the level of preparation decreased, the degree of emotional exhaustion increased.

The last determinant of occupational burnout symptoms examined was the types of violence experienced - the results showed higher severity of EE dimension symptoms in women who had experienced physical violence compared to the women who had not. Physical violence, which is always accompanied by psychological violence, results in a constantly experienced sense of threat due to the stimuli that produce a high degree of anxiety (e.g. hitting, pushing, tugging) (Roldán et al., 2013). Such strong stimuli automatically and intensely condition fear reactions with its vegetative component (including palpitations, shortness of breath, sweating, hand tremors). The cost of these reactions can pose a risk for the development of occupational burnout symptoms, especially emotional exhaustion, as anxiety is fundamentally related precisely to this dimension of occupational burnout (Golonka et al., 2019; Slivar, 2001). Roldán et al. (2013) compared the symptoms of occupational burnout, depression and anxiety with the experience of physical aggression and psychological aggression in a group of healthcare professionals. Compared to psychological aggression, physical aggression revealed more associations with the symptoms. Physical aggression was associated with: depression, EE and PA, while psychological aggression - exclusively with PA. These results also relate to the result of the comparison conducted in this study of the rates of women who experienced only psychological violence and those who also experienced other forms of violence (physical/sexual/economic). It can be concluded that the more forms of abuse a woman experiences, the higher the level of emotional exhaustion. This probably explains the mechanism of accumulating tension and exhausting the available resources in the most stressed women. The result is a loss of strength, discouragement from work, and even dissatisfaction and helplessness.

## Conclusions

This study fills an important research gap that concerns the relationship between the experience of domestic violence and the risk of developing symptoms of occupational burnout exactly in the group of Polish women who work. The research underscores the importance of

the symptoms of occupational burnout that make up the EE dimension, which appeared to be most severe in the study group of women. What is more, women who are older, have longer work experience, vocational education, and have experienced also violence other than psychological violence, are most likely to experience symptoms such as excessive fatigue, loss of energy, lack of enthusiasm for action, the need to put more effort into work, discouragement, dissatisfaction, internal tension, among others. This group of women should be given special attention in the work environment. It should be noted that the symptoms of EE dimension can be sort of an alarm signal in the work environment indicating that the employee has a problem in their private life. This is especially important in view of the fact that victims of domestic violence hide their problem for a long time, thus hindering the possibility of receiving outside help.

The results of the study provide the basis for the following practical implications for intervention-based activities in the work setting of victims of domestic violence, which is important especially for executives:

1. Adequate recognition of the causes of employees' problems, especially the causes of the EE symptoms of occupational burnout that manifest themselves at work.
2. Conducting intervention-based activities in the workplace especially for the employees who are the potential victims of domestic violence, based on:
  - a. awareness-raising education on: mechanisms of violence, types of violence, ways to deal with it,
  - b. social skills training, including stimulating assertiveness,
  - c. stress management training and problem-solving strategy training.
3. Providing instrumental support in the form of access to information on entities that provide assistance to victims of domestic violence and procedures for dealing with the problem of violence.

Providing support to victims of domestic violence in the workplace is important for the employee and can be significantly conducive to allow the employee to cope with it. It also has implications for the workplace itself, because, as already mentioned, an employee experiencing domestic violence may be less effective, which may consequently affect organizational performance.

## References

1. *Act on the Prevention of Domestic Violence of 29 July 2005* (Journal of Laws 05.180.1493).
2. Ahmadabadi, Z., Najman, J.M., Williams, G.M., Clavarino, A.M., d'Abbs, P., Tran, N. (2020). Intimate partner violence and subsequent depression and anxiety disorders. *Social Psychiatry and Psychiatric Epidemiology*, 55(5), 611-620.

3. Ahola, K., Honkonen, T., Isometsa, E. et al. (2006). Burnout in the general population. Results from the Finnish Health 2000 Study. *Soc. Psychiatry Epidemiol.*, 41, 11-17.
4. Alameddine, M., Kazzi, A., El-Jardali, F., Dimassi, H., Maalouf, S. (2011). Occupational violence at Lebanese emergency departments: Prevalence, characteristics and associated factors. *Journal of Occupational Health*, 53, 455-464.
5. Baker, D.E., Hill, M., Chamberlain, K., Hurd, L., Karlsson, M., Zielinski, M., Calvert, M., Bridges, A.J. (2021). Interpersonal vs. Non-Interpersonal cumulative traumas and psychiatric symptoms in treatment-seeking incarcerated women. *Journal of Trauma and Dissociation*, 22(3), 249-264.
6. Bakker, A.B., Schaufeli, W.B., Demerouti, E., Janssen, P.P.M., Van Der Hulst, R., Brouwer, J. (2000). Using equity theory to examine the difference between burnout and depression. *Anxiety, Stress, & Coping*, 13(3), 247-268. <https://doi.org/10.1080/10615800008549265>
7. Biuro Rzecznika Praw Obywatelskich [Polish Commissioner for Human Rights's Office] (2023). *Program przeciwdziałania przemocy w rodzinie na 2023 r. – uwagi i postulaty RPO. Odpowiedź MriPS*. Retrieved from: <https://bip.brpo.gov.pl/pl/content/rpo-przeciwdzialanie-przemocy-rodzina-program-schmidt-odpowiedz>, 6.09.2024.
8. Brown, S.J., Mensah, F., Giallo, R., Woolhouse, H., Hegarty, K., Nicholson, J.M., Gartland, D. (2020). Intimate partner violence and maternal mental health ten years after a first birth: An Australian prospective cohort study of first-time mothers. *Journal of Affective Disorders*, 262, 247-257.
9. Campbell, J.C. (2002). Health consequences of intimate partner violence. *Lancet*, 359(9314), 1331-1336. [https://doi.org/10.1016/S0140-6736\(02\)08336-8](https://doi.org/10.1016/S0140-6736(02)08336-8)
10. Campbell, J.C., Anderson, J.C., McFadgion, A., Gill, J., Zink, E., Patch, M., Callwood, G., Campbell, D. (2018). The effects of intimate partner violence and probable traumatic brain injury on central nervous system symptoms. *Journal of Women's Health (Larchmt)*, 27(6), 761-767.
11. Campbell, J., Jones, A., Dienemann, J., Kub, J., Schollenberger, J., O'Campo, P. et al. (2002). Intimate partner violence and physical health consequences. *Archives of Internal Medicine*, 162(10), 1157-1164.
12. Charak, R., Vang, M.L., Shevlin, M., Ben-Ezra, M., Karatzias, T., Hyland, P. (2020). Lifetime interpersonal victimization profiles and mental health problems in a nationally representative panel of trauma-exposed adults from the United Kingdom. *Journal of Traumatic Stress*, 33(5), 654-664.
13. Cheng, Y., Chen, I.S., Chen, C.J., Burr, H., Hasselhorn, H.M. (2013). The influence of age on the distribution of self-rated health, burnout and their associations with psychosocial work conditions. *J. Psychosom. Res.*, 74, 213-220.

14. Czarkowska, M. (2014). *Przeciwdziałanie przemocy wobec kobiet w rodzinie w praktyce organów ścigania, wymiaru sprawiedliwości i innych instytucji*. Warszawa: LexisNexis, 26-27.
15. Daugherty, J.C., Pérez-García, M., Hidalgo-Ruzzante, N., Bueso-Izquierdo, N. (2021). Perceived executive functioning among female survivors of intimate partner violence. *Journal of Aggression, Maltreatment & Trauma*, 30(1), 25-42.
16. de Paiva, L.C., Canário, A.C.G., de Paiva China, E.L.C., Gonçalves, A.K. (2017). Burnout syndrome in health-care professionals in a university hospital. *Clinics (Sao Paulo)*, 72(5), 305-309. doi: 10.6061/clinics/2017(05)08
17. Embich, J.L. (2001). The relationship of secondary special education teachers' roles and factors that lead to professional burnout. *Teacher Education and Special Education*, 24, 58-69. <https://doi.org/10.1177/088840640102400109>
18. Estryn-Behar, M., van der Heijden, B., Camerino, D., Fry, C., Le Nezet, O., Conway, P.M., Hasselhorn, H.M., NEXT Study Group (2008). Violence risks in nursing —Results from the European NEXT Study. *Occupational Medicine*, 58, 107-117. doi:10.1093/occmed/kqm142
19. Gam, J., Kim, G., Jeon, Y. (2016). Influence of art therapists' self-efficacy and stress coping strategies on burnout. *The Arts in Psychotherapy*, 47, 1-8. doi: 10.1016/j.aip.2015.09.005
20. Gibbs, A., Jewkes, R., Willan, S., Washington, L. (2018). Associations between poverty, mental health and substance use, gender power, and intimate partner violence amongst young (18-30) women and men in urban informal settlements in South Africa: A cross-sectional study and structural equation model. *PLoS One*, 13(10), e0204956.
21. Gibson, C.J., Huang, A.J., McCaw, B., Subak, L.L., Thom, D.H., Van Den Eeden, S.K. (2019). Associations of intimate partner violence, sexual assault, and posttraumatic stress disorder with menopause symptoms among midlife and older women. *JAMA Internal Medicine*, 179(1), 80-87.
22. Golonka, K., Mojsa-Kaja, J., Blukacz, M., Gawłowska, M., Marek, T. (2019). Occupational burnout and its overlapping effect with depression and anxiety. *International Journal of Occupational Medicine and Environmental Health*, 32, 229-244.
23. Hillert, A. (2024). Burnout: Hintergründe, Konzepte, Perspektiven [Burnout: Historical Background, Concepts, Methodological Problems, Prevention And Different Perspectives On A Striking Phenomenon]. *Fortschritte der Neurologie-Psychiatrie*, 92(5), 194-208. <https://doi.org/10.1055/a-2256-4439>
24. Karakurt, G., Patel, V., Whiting, K., Koyuturk, M. (2017). Mining electronic health records data: Domestic violence and adverse health effects. *Journal of Family Violence*, 32(1), 79-87.
25. Klusmann, U., Aldrup, K., Schmidt, J., Lüdtke, O. (2021). Is emotional exhaustion only the result of work experiences? A diary study on daily hassles and uplifts in different life



- domains, *Anxiety, stress, and coping*, 34(2), 173-190. <https://doi.org/10.1080/10615806.2020.1845430>
26. Kristensen, T.S., Borritz, M., Villadsen, E., Christensen, K.B. (2005). The Copenhagen burnout inventory: A new tool for the assessment of burnout. *Work and Stress*, 19, 3, 192-207.
27. Kroupis, I., Kourtessis, T., Kouli, O., Tzetzis, G., Derri, V., Mavrommatis, G. (2017). Job satisfaction and burnout among Greek P.E. teachers. A comparison of educational sectors, level and gender. *Cultura, Ciencia y Deporte*, 12(34), 5-14.
28. Lagdon, S., Armour, C., Stringer, M. (2014). Adult experience of mental health outcomes as a result of intimate partner violence victimisation: A systematic review. *European Journal of Psychotraumatology*, 5, Article 24794.
29. Lindblom, K.M., Linton, S.J., Fedeli, C., Bryngelsson, I.L. (2006). Burnout in the working population: relations to psychosocial work factors. *Int. J. Behav. Med.*, 13, 51-59.
30. Loxton, D., Dolja-Gore, X., Anderson, A.E., Townsend, N. (2017). Intimate partner violence adversely impacts health over 16 years and across generations: A longitudinal cohort study. *PLoS One*, 12(6), e0178138.
31. Łukowska, K. (2018). *Rozwiązywanie problemów alkoholowych oraz ograniczanie dostępności alkoholu w gminach i miastach. Przewodnik dla samorządowców*. Warszawa: Mazowieckie Centrum Polityki Społecznej.
32. Majkowska, N. (2021). *Wypalenie zawodowe w opiece. Badania psychologiczne pielęgniarek i osób z chorobą Alzheimerą*. Kraków: Uniwersytet Jagielloński w Krakowie, Biblioteka Jagiellońska.
33. Marchand, A., Durand, P., Haines, V., Harvey, S. (2015). The multilevel determinants of workers' mental health: results from the SALVEO study. *Soc. Psychiatry Psychiatr. Epidemiol.*, 50, 445-459.
34. Martínez-Jarreta, B., Gascón, S., Santed, M.A., Goicoechea, J. (2007) Medical-legal analysis of aggression towards health professionals. An approach to a silent reality and its consequences on health. *Medicina Clínica*, 128, 307-310. doi:10.1157/13099583
35. Maslach, D., Jackson, S., Leiter, M., Schaufeli, W., Schwab, R. (1986). *Maslach burnout inventory manual, general survey, human services survey, educators survey and scoring guides*. Menlo Park, CA: Mond Garden.
36. Maslach, C., Schaufeli, W.B., Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology*, 52(1), 397-422. <https://doi.org/10.1146/annurev.psych.52.1.397>
37. Maslach, Ch. (1998). A Multidimensional Theory of Burnout. In: C.L. Cooper (ed.), *Theories of Organizational Stress* (pp. 68-85). New York: Oxford University Press.
38. McFerran, L. (2011). *Safe at home, safe at work? National Domestic Violence and the Workplace Survey*. ADFVC, UNSW.

39. Montgomery, A.J., Peeters, M.C.W., Schaufeli, W.B., Den Ouden, M. (2003). Work-home interference among newspaper managers: Its relationship with burnout and engagement. *Anxiety, Stress, & Coping*, 16, 195-211. <https://doi.org/10.1080/1061580021000030535>
40. Moreno Jiménez, M.A., Vico Ramírez, F., Zerolo Andrey, F.J., López Rodríguez, A., Herrera Serena, P., Mateios Salidoc, M.J. (2005). Analysis of patients' violence in primary care. *Atención Primaria*, 36, 152-158. doi:10.1157/13077484
41. Norlund, S., Reuterwall, C., Höög, J., Lindahl, B., Janlert, U., Birgander, L. S. (2010). Burnout, working conditions and gender--results from the northern Sweden MONICA Study. *BMC Public Health*, 10, 326. <https://doi.org/10.1186/1471-2458-10-326>
42. Pasikowski, T. (2000). Polska adaptacja Maslach Burnout Inventory. In: H. Sęk (ed.), *Wypalenie Zawodowe. Przyczyny. Mechanizmy. Zapobieganie* (pp. 135-148). Warszawa: PWN.
43. Peeters, M.C.W., Montgomery, A.J., Bakker, A.B., Schaufeli, W.B. (2005). Balancing work and home: How job and home demands are related to burnout. *International Journal of Stress Management*, 12(1), 43-61. <https://doi.org/10.1037/1072-5245.12.1.43>
44. Piko, B.F. (2006). Burnout, role conflict, job satisfaction and psychosocial health among Hungarian health care staff: A questionnaire survey. *International Journal of Nursing Studies*, 43, 3, 311-318.
45. Roldán, G., Salazar, I., Garrido, L., Ramos, J. (2013). Violence at work and its relationship with burnout, depression and anxiety in healthcare professionals of the emergency services. *Health*, 5, 193-199. doi: 10.4236/health.2013.52027.
46. Sabbah, I., Sabbah, H., Sabbah, S., Akoum, H., Droubi, N. (2012). Burnout among Lebanese nurses: Psychometric properties of the Maslach Burnout Inventory-Human Services Survey (MBI-HSS). *Health*, 4, 644-652. doi:10.4236/health.2012.49101
47. Schaufeli, W.B., Van Dierendonck, D. (1993). The construct validity of two burnout measures. *Journal of Organizational Behavior*, 14, 7, 631-647.
48. Şen, C. (2023). Investigation of burnout levels of special education teachers. *Journal for the Education of Gifted Young Scientists*, 11(4), 521-528. doi: <http://dx.doi.org/10.17478/jegys.1344410>
49. Siudem, A. (2013). Poczucie sensu życia i system wartości kobiet współzależnych. In: M. Kalinowski, I. Niewiadomska, L. Szot. (Eds.), *Cierpienie między sensem a bez sensem. Studium interdyscyplinarne* (pp. 149-168). Łuck (Ukraina).
50. Slivar, B. (2001). The syndrome of burnout, self-image, and anxiety with grammar school students. *Horizons Psychol*, 10, 21-32.
51. Swanberg, J., Logan, T.K., Macke, C. (2005). Intimate partner violence, employment and the workplace: Consequences and future directions. *Trauma, Violence, & Abuse*, 6, 286-312.

52. Swanberg, J., Logan, T.K., Macke, C. (2006). The consequences of partner violence on employment and the workplace. In: K. Kelloway, J. Barling, J. Hurrell Jr. (Eds.), *Handbook of workplace violence* (pp. 351-379). Newbury Park, CA: Sage.
53. Verdonk, P., Hooftman, W.E., van Veldhoven, M.J., Boelens, L.R., Koppes, L.L. (2010). Work-related fatigue: the specific case of highly educated women in the Netherlands. *Int. Arch. Occup. Environ. Health*, 83, 309-321.
54. White, S.J., Sin, J., Sweeney, A., Salisbury, T., Wahlich, C., Montesinos Guevara, C. M., Gillard, S., Brett, E., Allwright, L., Iqbal, N., Khan, A., Perot, C., Marks, J., Mantovani, N. (2024). Global Prevalence and Mental Health Outcomes of Intimate Partner Violence Among Women: A Systematic Review and Meta-Analysis. *Trauma, Violence & Abuse*, 25(1), 494-511. <https://doi.org/10.1177/15248380231155529>



## TURNOVER INTENTION AMONG STUDENTS WHO TAKE UP GAINFUL ACTIVITY

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**Purpose:** The purpose of this paper is to assess the intention to leave one's current job among students who start full-time university education and take up gainful activity in the course of their studies.

**Design/methodology/approach:** The empirical material was obtained through a survey carried out by means of a questionnaire. The survey was conducted in 2023 on a sample of students of the Faculty of Economics, Finance and Management of the University of Szczecin who were starting their first-cycle full-time courses. The sample comprised 53 out of 205 respondents who were taking up gainful activity.

**Findings:** The investigated population of students who were engaged in gainful activity showed practically no skewness when it comes to the shape of the analysed construct of turnover intention. The distribution of the investigated variable develops towards a regular distribution. No significant differences in the synthetic measure (construct) in selected groups of respondents were noted either. Therefore, this research does not allow identification of sensitive groups for whom support instruments should be directed.

**Research limitations/implications:** The analysis is based on respondents' subjective declarations. The research was carried out on a fragment of the sample (53 respondents) and also, as a consequence, on not too numerous sub-groups.

**Practical implications:** With a view to supporting combining studies with gainful employment, motives that students are guided by, including turnover motivation, should be constantly monitored.

**Originality/value:** The subject matter of turnover intention among working students is not addressed in literature. Thus, this research fits this lacuna.

**Keywords:** turnover intention, gainful activity, combining work with studies.

**Category of the paper:** research paper.

### 1. Introduction

Time spent at the university mainly involves acquisition of knowledge necessary to take up – in the future – positions that are related to the specialization studied. It is also a time of obtaining other professional experiences (future students usually gain their first work

experience at earlier stages of education). Reconciling the role of a student and an employee may hinder full participation in classes and individual studying which may translate into specific shortcomings in this sphere. This gives rise to a conflict of roles. On the other hand, work experience acquired during studies builds future potential of a graduate who enter the labour market after completing their studies. Thanks to this, the basic goal of education – the utilitarian goal – is being realized.

It also needs to be noted that students usually work in low-paying jobs not directly related to the specialization studied, markedly below the opportunities that they will present themselves before them when they enter the labour market as graduates. The research carried out in this paper also confirms this. Thus, students may not see themselves at the current employer in the future and treat this activity as something temporary. This may entail specific consequences in the sphere of motivation to work, including strong motivation to leave their current job, manifested in the research by high turnover intention. This subject matter is not addressed in the relevant body of literature, hence this study fills the resulting scientific lacuna.

The purpose of this paper is to assess the intention to leave one's current job among students who start full-time studies and take up gainful activity in the course of their university education. This paper is both theoretical and empirical. The theoretical part focuses on questions of taking up gainful employment during studies, the conflict of roles that accompanies this activity and the subject matter of identification of turnover intention. The work's empirical sphere presents results of the survey on professional experience and gainful activity of students who begin their first-cycle full-time university education. The research sample was made up of 205 students at the Faculty of Economics, Finance and Management of the University of Szczecin, though due to the subject matter examined, this work focused on a fraction of the sample – students who take up gainful activity (thus combining studies with work), which clearly limited the scope of the cases analysed in the research ( $n = 53$ ). Conclusions drawn from this research cannot be generalised for the total group of students.

## 2. Theory

The research of the Centre for Public Opinion Research (CBOS) identifies first professional experiences among secondary school students in the group of 85% of boys and 67% of girls (Kołodziej, 2015). The latest research carried out under the Eurostudent<sup>1</sup> project shows that more than 60% of those that begin their university studies have already had some work experience. This percentage grows along with the expansion of the analysed population (to include students of further years). For example, in research by Sarzyńska-Mazurek (2021),

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<sup>1</sup> This analysis was carried out on the basis of data made available at: <http://database.eurostudent.eu/drm/>, 2024.09.05.

carried out not only among freshmen, this percentage was 70%. The same research shows that university years are a period of getting one's first professional experiences for only 13% of respondents (who have not had these at earlier stages of education). The remainder of the structure includes passive persons not interested in taking up any gainful activity. This population is estimated, depending on the research, at between 11% (Krause, 2012) and 25 % (Malicki, 2013).

Another issue concerns covering the entire period of studies in the analysis in the context of combining university education with gainful activity. When it comes to this we also have some estimates. Research by Chu, Creed, Conlon (2021) shows that in English-speaking countries the percentage of students who combine studies with work is between 70% and 80% (with a constant rising trend – Hall, 2010). Polish research estimates of similar structures are markedly lower. It may be assumed that half of the students both work and study at the same time (Krause, 2012; Sarzyńska-Mazurek, 2021), though there are also some studies in the light of which this population is only 12% of the total (Nyćkowiak, Kołodziej, 2014 – therefore, the range of the percentages of these structures is quite great).

The Eurostudent research shows that Polish students carry a relatively heavy work burden. This is shown by a rather high share of the time devoted to work in their total time budget. There is a markedly high percentage of Polish working students who believe themselves to be more employees than students (59.4%). This burden may, of course, have a negative effect on combining studies with work, though at the same time it brings them practical experience, so important from the point of view of their future position in the labour market (Lenart, 2014; Creed, French, Hood, 2015). It is worth noting that in the light of research by Sarzyńska-Mazurek (2021), 53 % of students declare that working while studying is not very problematic for them.

Therefore, a conflict of roles may be detected between work and studying<sup>2</sup>. These roles may overlap. A crucial issue in this context is boundary management determined by understanding how students manage their roles and how they balance them distributing their resources according to their capabilities and preferences (Greenhaus, Collins, Shaw, 2003).

Boundary management strategies may be focused on roles separation (e.g. clear separation of work hours from activities associated with studying) or on their integration (e.g. possibility to talk at work about studying) (Kossek, Lautsch, 2012). Separation facilitates creating boundaries of roles but may also make it difficult for individuals to move between roles. In turn, integration may intensify role blurring, which may be stressful, but at the same time helps individuals to move between these roles (Winkel, Clayton, 2010).

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<sup>2</sup> Just like other conflicts, such as work–family or family–work conflicts, are identified in the literature (Kreiner, 2006).

People create, maintain and adjust their boundaries, to simplify their beliefs on roles and to reduce stress associated with conflicts of roles especially in the perspective of incapability of assigning an adequate amount of resources to meet too many expectations (Ashforth, Kreiner, Fugate, 2000).

Does the perspective of conflicts of roles not infer risks of higher motivation to leave a job or frequent turnover? This research perspective is not present in the literature; hence the present study fills this scientific lacuna.

Research on employee turnover involves a lot of methodological difficulties since it maybe only be conducted post factum, when the employee is no longer a member of a given organization. The decision to leave the organization may mature in one for a very long period of time on the one hand, and on the other, may be difficult to capture when the period between the decision to leave the organization and the fact of leaving is short. A solution to mitigate these methodological inconveniences is to investigate turnover intention among employees who might be close to taking a decision (intention) to leave, but nevertheless have not left the organization. Thus, intention precedes actions that will be taken at a later stage. This intention, therefore, reflects willingness to leave the organization quickly and unwillingness to establish a relation between them and the organization in the long run (when the decision to leave the organization matures) (Hughes, Avey, Nixon, 2010; Long, Thean, Ismail, Jusoh, 2012).

An employee leaving entails a number of negative consequences for the organization, starting with losing human capital when a talented employee quits, to costs of recruitment and training, to negative feelings accompanying a colleague departing (survivor syndrome) or to fear accompanying arrival of new members of the organization (Bibby, 2008; Avery, Luthans, Jensen, 2009; Hwang, Lee, Park, Chang, Kim, 2014). It is estimated that turnover costs account for 15 to 30% of total costs of organizations (Wong, Laschinger, 2015).

### **3. Methodological aspects of the research**

The material analysed comes from a survey on professional experience and gainful activity of students who begin their first-cycle full-time studies. This was the second mutation of this research project<sup>3</sup>. The research was conducted among students of the Faculty of Economics, Finance and Management of the University of Szczecin. They were representatives of six fields of study (IT in business, Logistics, Engineering logistics, Entrepreneurship and Investment, Management and RES management). The survey comprised 33 questions, of which 8 were placed in the particulars section. Some of these questions allowed identification of groups of respondents taking into account the following classification criteria:

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<sup>3</sup> Empirical material in the first edition was gathered from November to December 2021.



- gender (question 1),
- place of residence (question 3 – variants of responses: major city, town, town-commune, village),
- household (question 4 – variants of responses: living with parents, living on one's own in a separate apartment or halls of residence, living in a rented room),
- family's financial situation (question 5 – five variants of responses: very good, good, moderate, bad, very bad).

The structures of responses to these questions are presented and discussed in the Table 3 – related passage.

Ultimately, empirical material was collected from 205 questionnaires. This study analyses fragmentary material. Partial questions on turnover intention were only answered by respondents who are currently in gainful employment (they chose the first option in the question about their engagement in gainful activity - Table 1). This option was chosen by 62 respondents (30.4% of the sample). Out of this group, 53 respondents gave their feedback to partial questions on turnover intention. After introducing additional criteria of classification of the study population, the different groups could have been, therefore, not very big; it is quite difficult to draw reliable conclusions in such a case (the numbers of students in each group are presented in the tables presented later. This is the shortcoming of this research. The research's time horizon is October-November 2023 (the survey was directed to respondents who were just beginning their studies).

Statistical significance of differences in declarations of respondents from groups identified out of the adopted criteria of division of population was specified in the case of two investigated groups using the t-Student test; in the case of a greater number of investigated groups (three and more) – on the basis of a one-way analysis of variance (ANOVA - in this case statistical significance for difference for the total groups was assessed on the basis of the F test result, there were no differences in pairs of groups on the basis of a series of post-hoc tests). A reference to the central limit probability  $p = 0.05$  was specified as part of the p-value test.

Turnover intention was examined among the respondents using a four-time measurement scale designed by Hom, Griffeth and Sellaro (1984). Respondents could express their beliefs for each statement presented in the measurement scales given above under a five-point Likert scale, where 1 meant strongly disagreeing with a statement and 5 - strongly agreeing with the statement. Reverse adjustment procedure was applied to two positions in the measurement scale. Statements about turnover intention were directed content-wise towards an analysis of one's will to remain in the current workplace. The declining values of the synthetic measure, therefore, evidenced greater motivation to leave one's current post. The value of the synthetic measure of the construct for a given respondent was specified on the basis of an arithmetic mean of partial measures.

The mean of the values of constructs specified for individual respondents was analysed for the total study population and within the investigated groups of respondents. The data presented in the histogram was calculated for the entire study population on the basis of the measure of statistical description, while convergence in probability of a variable with regular distribution was examined using the Shapiro-Wilk test.

Working respondents were asked to specify the kind of work they did (which allowed general assignment of the job to the industry branch) and the form of employment and to declare whether their current earnings allowed them to support themselves. Respondents' declarations set criteria for assigning them to the analysed groups in which analyses of mean measures of the value of the investigated construct were also carried out (statistical significance of differences in groups according to the formula discussed so far - t-Student test or ANOVA, depending on the number of groups).

Respondents also specified the number of work hours a week and their monthly salary (based on which their hourly wage was estimated). Linear correlation was used to study related correlations with turnover intention. Statistical significance of correlation measures was examined by specifying the p-value calculated in the measurement procedure (referred to against the central limit probability  $p = 0.05$ ).

#### 4. Research results

In the first stage of the research, a statistical analysis of the variable reflecting the construct of turnover intention in the research sample was carried out. 30.4% respondents (62 students) declared that they were engaged in gainful activity at that moment (Table 1). Out of this pool, 53 respondents presented their declarations about their turnover intention in relation to their current job. This data was further analysed (a synthetic measure that reflected the investigated construct could be established for this group). Close to 70% of respondents did not combine their studies with gainful activity, of which 51.5% had some work experience and 18.1% of them - did not have any work experience at all.

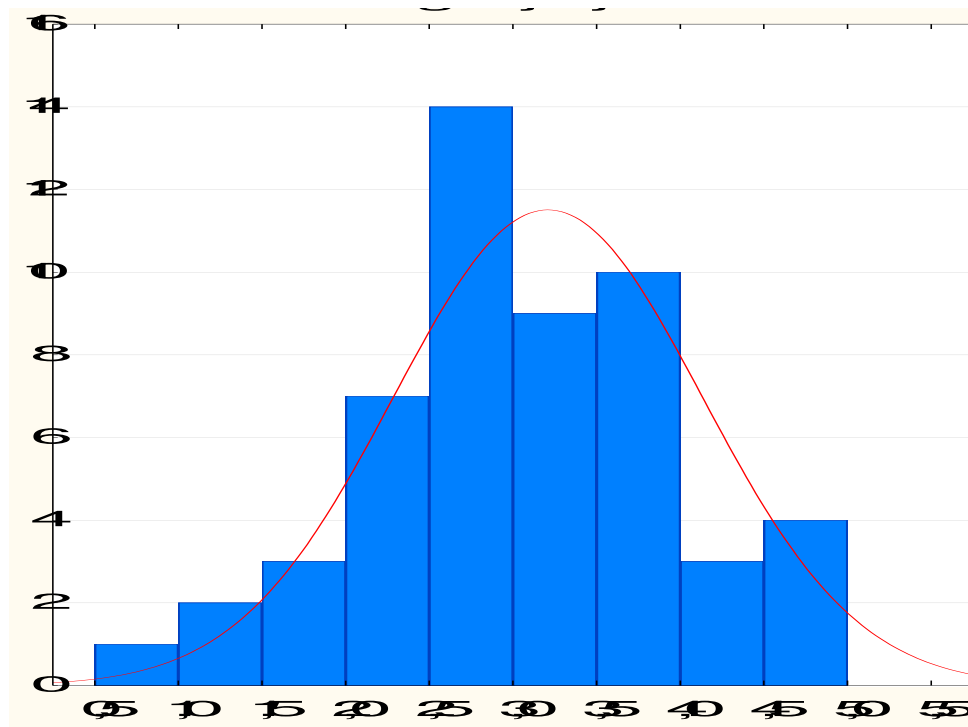
**Table 1.**

*Respondents' gainful employment status*

| Option  | n   | %     |
|---|-----|-------|
| I am now involved in gainful activity (I am working)                                    | 62  | 30.4  |
| I am not involved in gainful activity at the moment, but I do have some work experience | 105 | 51.5  |
| I do not have any work experience   | 37  | 18.1  |
| Total   | 204 | 100.0 |

Source: author's own compilation on the basis of author's own research.

Figure 1 shows a histogram presenting the probability distribution of the variable: turnover intention, while Table 2 presents basic measures of descriptive statistics of the investigated sample fragment.



**Figure 1.** Histogram of probability distribution of the variable: turnover intention.

Source: author's own compilation on the basis of author's own research.

**Table 1.**

*Descriptive statistics on the variable: turnover intention*

| measures                  | value      |
|---------------------------|------------|
| minimum                   | 1          |
| first quartile            | 2.8        |
| mean                      | 3.19       |
| median                    | 3          |
| third quartile            | 3.8        |
| maximum                   | 5          |
| standard deviation        | 0.92       |
| typical area of variation | 2.27- 4.11 |
| skewness                  | 0.7        |
| kurtosis                  | -0.09      |

Source: author's own compilation on the basis of author's own research.

The distribution of the investigated variable is convergent with a regular distribution. It is also confirmed analytically by results of the Shapiro-Wilk test ( $W = 0.977$ ,  $p = 0.381$  –  $p$ -value above central limit probability  $p = 0.05$ ). Most of the observations focus on the typical area of variability (2.27 – 4.11 range), thus on measures that reflect a neutral approach to partial statements. This is also confirmed by measures of the central trend hovering around 3. That is the value that the median takes. The arithmetic mean for the total respondents (against which mean measures in the analysed groups of respondents will be juxtaposed) is slightly

higher at 3.19. The value of the median below the average points to a slight right skewness of the distribution of the analysed variable. This is confirmed by the measure of skewness above zero (0.7). This skewness does not seem profound, but it evidences that options that evidenced respondents' greater motivation to leave their current jobs were selected more often. The probability distribution may be said to be mesokurtic (confirmation of convergence with a regular distribution) because the kurtosis hovers around zero.

In the next step mean values were calculated for the synthetic measures that reflected turnover intention in groups of respondents singled out taking into consideration four criteria of division of the population (particulars). Relevant data is presented in Table 3. It may also be juxtaposed against the total respondents (3.19). The table also presents the structure of the sample in the four dimensions listed below (in the sample fragment created by persons who engage in gainful activity – active – and in the entire sample – column 4).

**Table 3.**

*Characteristics of groups of respondents singled out taking into account criteria of population division in the context of turnover intention*

| categories/options                                       | n  | %      |       | turnover intention |
|--|----|--------|-------|--------------------|
|  |    | active | total |                    |
| <b>criterion: gender (p = 0.802)</b>                     |    |        |       |                    |
| women  | 24 | 45.3   | 45.3  | 3.20               |
| men  | 29 | 54.7   | 54.7  | 3.15               |
| <b>criterion: place of residence (p = 0.561)</b>         |    |        |       |                    |
| major city   | 30 | 56.6   | 52.5  | 3.08               |
| town   | 7  | 13.2   | 14.4  | 2.96               |
| town-commune   | 9  | 17.0   | 15.8  | 3.50               |
| village  | 7  | 13.2   | 17.3  | 3.36               |
| <b>Criterion: household (p = 0.909)</b>                  |    |        |       |                    |
| living with parents                                      | 31 | 60.8   | 60.3  | 3.11               |
| living on one's own (in a separate apartment)            | 14 | 27.5   | 20.1  | 3.14               |
| living on one's own (halls of residence, rented room)    | 6  | 11.8   | 19.6  | 3.29               |
| <b>Criterion: family financial situation (p = 0.657)</b> |    |        |       |                    |
| very good  | 16 | 32.7   | 18.7  | 3.27               |
| good   | 22 | 44.9   | 52.8  | 3.25               |
| moderate   | 8  | 16.3   | 31.2  | 2.69               |
| bad  | 2  | 4.1    | 4.1   | ND                 |
| very bad   | 1  | 2.0    | 3.1   | ND                 |

Source: author's own compilation on the basis of author's own research.

The first analysed criterion of division of the population was respondents' gender. The structures of the population of students in gainful activity and of the total respondents do not differ. Women prevail slightly in the group at 54.7%. No significant differences were noted in the mean measure reflecting turnover intention in both groups (p-value for t-Student test slightly above the central limit measure  $p = 0.05$ ), though slightly greater motivation to leave one's job was observed among men.

The first analysed criterion of division of the population was respondents' place of residence. Most of the persons investigated lived in a major city and a relatively similar share (around 15%) is observed for other analysed options. Among persons in gainful employment

there is slight under-representation of persons living in villages, which boosts the participation of respondents living in major cities. The mean reflecting turnover intention was in the range between 2.96 (students living in a town with poviat rights – relatively greatest motivation to leave their jobs) to 3.5 (respondents living in towns that are at the same time capital cities of communes). In this case too, no statistically significant differences were recorded for respondents (p-value for ANOVA,  $p = 0.561$  – slightly above the central limit value) singled out taking into account the investigated criterion.

The third analysed criterion of division of the population was respondents' household situation. A marked majority of respondents (60%) still lived with their parents (no difference is seen between persons engaged in gainful employment and those that are not; in the group of persons engaged in gainful activity there is certain under-representation of those staying in halls of residence or rented rooms, as relatively more persons in gainful activity live in their own flats. Relatively greatest motivation for turnover is expressed by students who stay with their parents (mean 3.11 – lower risk of deciding to quit); at the other end of the scale are respondents who stay in halls of residence or in rented rooms (mean 3.29). However, we need to approach the emerging differences with caution. They are not great enough to call them statistically significant (p-value for ANOVA greatly above the central limit value).

The last analysed criterion of division of the study population was the financial situation of respondents' families. Persons who declared their families were in a very good financial situation took up gainful activity markedly more often. Thus, persons in gainful employment are under-represented in groups selecting option two and three (good financial situation and moderate financial situation, respectively). It needs to be noted that majority of respondents selected positive variants of responses to questions about their families' financial situation. Those who chose the option of a bad or very bad financial situation were in the clear minority (below 10%). With a relatively small representation of person engaged in gainful activity, only three of them chose option four and five. As a consequence, these options were removed from the analysis (no data). Taking all of the above into consideration, no statistically significant differences were observed for the mean reflecting the construct of turnover intention in selected groups of respondents (p-value at 0.657). There is a downward trend of the analysed mean as the financial situation of respondents' families worsens (taking into account, however, only three analysed options).

Selected characteristics of respondents in gainful activity in the context of turnover intention are presented in Table 4.

**Table 4.***Selected characteristics of respondents in gainful activity in the context of turnover intention*

| categories/options  | n  | %      |       | turnover intention |
|---|----|--------|-------|--------------------|
|   |    | active | total |                    |
| <b>Industry (p = 0.404)</b>                               |    |        |       |                    |
| catering  | 11 | 24.4   | ND    | 3.3                |
| trade   | 12 | 26.7   | ND    | 2.9                |
| IT  | 4  | 8.9    | ND    | 2.8                |
| industry and logistics                                    | 7  | 15.6   | ND    | 3.4                |
| services  | 11 | 24.4   | ND    | 3.5                |
| <b>Form of employment (p = 0.996)</b>                     |    |        |       |                    |
| employment contract (full time)                           | 0  | 0.0    | 1.8   | ND                 |
| employment contract (part time)                           | 5  | 10.4   | 8.9   | 3.40               |
| mandate contract/a specific work contract                 | 34 | 70.8   | 67.9  | 3.18               |
| apprenticeship/scholarship                                | 0  | 0.0    | 0     | ND                 |
| self-employed (company owner)                             | 4  | 8.3    | 10.7  | 3.25               |
| no contract   | 3  | 6.3    | 7.1   | 3.67               |
| <b>Earnings sufficient to support oneself (p = 0.190)</b> |    |        |       |                    |
| yes   | 26 | 52.0   | 50.9  | 2.98               |
| no  | 24 | 48.0   | 49.1  | 3.33               |

Source: author's own compilation on the basis of author's own research.

Respondents were asked to identify the work they did. On this basis, their work was assigned to a particular industry branch. Ultimately, the list of respondents' declarations was reduced to 5 industry branches for which a mean value of the construct of turnover intention was calculated. 12 respondents worked in trade (usually as shop assistants), 11 respondents, based on the work they did, were classified to quite a homogeneous catering group (usually as waiters/bartenders) and another 11 to a heterogeneous group of services (e.g. accountancy, beauty, modelling, security, rescue services or insurance). Respondents were also assigned to a very broad and capacious group representing jobs in industry and logistics and to the least populous group of those working in IT. The greatest mean values of the construct of turnover intention was observed for respondents representing the services sector (3.5). A relatively lowest turnover motivation was noted in this group. At the opposite end sits the IT industry with the mean value at 2.8. Differences in declarations of respondents in individual groups also in this case are not big enough to consider them statistically significant in the light of ANOVA results (p-value at 0.404).

Respondents in gainful activity also named their current form of employment. The great majority (70.8%) worked under a mandate contract or a specific work contract. Employment contract (part-time) was declared by 10.4% of study participants who were engaged in gainful activity. Some of them were also self-employed and three students worked without a contract. However, interestingly, the highest value of the analysed construct (3.67) was noted for the last group, which evidenced relatively weakest motivation to leave their organization. The lowest score of the synthetic measure analysed, close to the total average (3.18), was noted in the prevailing group of those working under a mandate contract or a specific work contract. Given the dominant position of this response variant in the structure, calculations of the synthetic measure in the context of informational value in the remaining groups need to be

approached with caution (these groups had only 3 to 5 respondents). Differences in declarations of respondents from groups singled out taking into account the analysed criterion of division of the study populations did not prove statistically significant (very low p-value – close to one).

Respondents were also asked to declare whether their earnings were currently sufficient to support themselves. Responses in the structure of declarations were distributed generally in equal halves. Quite a great differentiation of the mean synthetic measure that reflects the construct of turnover intention was noted. Interestingly, the fact of earning enough to support oneself does not mean that one will be less inclined to leave their job; quite the opposite. Differences in respondents' declarations in the analysed scope are not statistically significant, though it is worth noting the lowest p-value from the t-Student test analysed in such a case ( $p = 0.190$ ).

Respondents who were engaged in gainful activity also specified the number of hours they devoted to work and their monthly earnings. Respondents' declarations were compiled according to the value of the construct for a given respondent. Linear correlation coefficients were calculated. No statistically significant correlations were found for either of these cases (therefore, one needs to approach with caution any associations between these analysed variables). Both linear correlation coefficients were negative. Therefore, in the first case an increase in the number of hours devoted to work meant lesser turnover motivation ( $r_{xy} = -0.155$ ,  $p = 0.190$ ). In the second case, an increase in the hourly pay (the reported monthly rate was divided by the number of hours devoted to work in a month) also resulted in a lesser turnover motivation ( $r_{xy} = -0.099$ ,  $p = 0.290$ ).

## 5. Discussion

This research fits the thesis that combining work with university studies under the Polish tertiary education system is relatively less common compared to other highly-developed countries (Chu, Creed, Conlon, 2021). The analysed percentage of students who take up gainful activity is also clearly below the consensus compared with other research carried out on Polish study samples (30 % of population) (Krauze, 2012; Sarzyńska-Mazurek, 2021). However, it needs to be remembered that the research was carried out among first-year students in their first months of studying. Therefore, the population of students who do not yet have experience working (an 18% share) is relatively broad (Krauze, 2012). Having said that, this population will certainly shirk as the end of university education nears.

This research confirms that a mandate contract/specific work contract is the dominant form of employment among working students (adequate percentage in agreement with the consensus – 70%) (Jelonek, 2011; Nyckowiak, Kołodziej, 2014; Wronowska, 2015). At the same time, the research shows that employment without a contract is rare (6.3% of cases).

The research focuses on the question of specifying how high motivation to leave one's current job (turnover intention) is among respondents who engage in gainful activity. Students usually work in low-paying jobs, not related to their future work specialization, markedly below opportunities afforded to them after they graduate (waiter, shop assistant, warehouse worker etc.). Thus, they do not see themselves working for their current employer in the future, as confirmed by a number of studies. The subject matter of turnover intention among working students is not addressed in literature. Thus, this research fills the said lacuna. It needs to be noted that there was practically no skewness in formulating the analysed construct of turnover intention for the investigated population of students who are engaged in gainful activity (not too populous, which must be looked at as a research limitation). The distribution of the investigated variable develops towards a regular distribution. It would certainly be worth juxtaposing this structure of results against a relevant distribution of the population of working persons for identification of differences (directions of future research). No significant differences were noted either in the mean measure that reflects the investigated construct in selected groups of respondents. Therefore, this research does not allow identification of vulnerable groups that should attract focus in the context examined and to which support instruments should be directed.

When looking for directions for further research it would be worth conducting longitudinal studies to identify trends. One could also focus on other constructs that are usually examined in employee populations but not in the population of working students (e.g. job satisfaction, involvement). With a view to supporting combining studies with gainful employment, motives that students are guided by, including turnover motivation, should be constantly monitored. However, it is worth remembering in the analysed context that combining work with studying may distort an individual's course of studies and cause a conflict of roles (with consequences mainly to be borne by the individual), which, if these consequences are to be approached broadly, may also entail great wastage of funds in the education system (Chu, Creed, Conlon, 2019).

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## References

1. Ashforth, B., Kreiner, G., Fugate, M. (2000). All in a day's work: boundaries and micro role transitions. *Academy of Management Review*, Vol. 25, No. 3, pp. 472-491.
2. Avey, J.B., Luthans, F., Jensen, S.M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. *Human Resource Management*, Vol. 48, No. 5, pp. 677-693.
3. Bibby, C.L. (2008). Should i stay or shoul i leave? Perceptions of age discrimination, organizational justice and employee attitudes on intentions to leave. *Journal of Applied Management and Entrepreneurship*, Vol. 13, No. 2, pp. 63-86.
4. Chu, M.L., Creed, P.A., Conlon, E.G (2021). Work-Study Boundary Congruence, Contextual Support and Proactivity in University Students Who Work: A Moderated-Mediation Model. *Journal of Carieer Development*, Vol. 48, No. 2, pp. 166-181.
5. Creed, P.A., French, J., Hood, M. (2015). Working while studying at university. *Journal of Vocational Behaviour*. *Journal of Vocational Behaviour*, Vol. 86, pp. 48-57.
6. Greenhaus, J.H., Collins, K.M., Shaw, J.D. (2003). The relation between work-family balance and quality of life. *Journal of Vocational Behavior*, Vol. 63, No. 3, pp. 510-531.
7. Hall, R. (2010). The work-study relationship. *Journal of Education and Work*, Vol. 23, No. 5, pp. 439-449.
8. Hom, P.W., Griffeth, R.W., Sellaro, C.L. (1984). The validity of Mobley's (1977) model of employee turnover. *Organizational Behavior and Human Performance*, Vol. 34, No. 2, pp. 141-174.
9. Hughes, L.W., Avey, J.B., Nixon, D.R. (2010). Relationships between leadership and followers' quitting intentions and job search behaviors. *Journal of Leadership & Organizational Studies*, Vol. 17, No. 4, pp. 351-362.
10. Hwang, J., Lee, J., Park, S., Chang, H., Kim, S.S. (2014). The impact of occupational stress on employee's turnover intention in the luxury hotel segment. *International Journal of Hospitality & Tourism Administration*, Vol. 15, No. 1, pp. 60-77.
11. Jelonek, M. (2011). *Studenci - przyszłe kadry polskiej gospodarki*. Warszawa: PARP.
12. Kołodziej, S. (2015). Wczesna aktywność ekonomiczna i zawodowa – wzajemne zależności. In: T. Chirkowska-Smolak, J. Grobelny (Eds.), *Człowiek na rynku pracy – wyzwania i zagrożenia* (pp. 61-70). Kraków: Libron.
13. Kossek, E.E., Lautsch, B.A. (2012). Work-family boundary management styles in organizations. *Organizational Psychology Review*, Vol. 2, No. 2, pp. 152-171.
14. Krause, E. (2012). *Rozwój kariery zawodowej studentów. Konteksty i dokonania*. Bydgoszcz: Wydawnictwo Uniwersytetu Kazimierza Wielkiego.
15. Kreiner, G.E. (2006). Consequences of work-home segmentation or integration. *Journal of Organizational Behaviour*, Vol. 27, No. 4, pp. 485-507.

16. Long, C.S., Thean, L.Y., Ismail, W.K.W., Jusoh, A. (2012). Leadership styles and employees' turnover intention: Exploratory study of academic staff in a Malaysian College. *World Applied Sciences Journal, Vol. 19, No. 4*, pp. 575-581.
17. Malicki, K. (2013). Rzeszowscy studenci i ich pierwsza aktywność zawodowa. *Nierówności społeczne a wzrost gospodarczy, no. 33*, pp. 109-117.
18. Sarzyńska-Mazurek, E. (2021). Zasoby studentów w kontekście wyzwań współczesnego rynku pracy. *Lubelski Rocznik Pedagogiczny, Vol. 40, No. 3*, pp. 251-267.
19. Schneider, M., Yin, L. (2011). *The hidden costs of community colleges*. Washington: American Institutes for Research.
20. Winkel, D.E., Clayton, R.W. (2010). Transitioning between work and family roles as a function of boundary flexibility and role salience. *Journal of Vocational Behaviour, Vol. 76, No. 2*, pp. 336-343.
21. Wong, C.A., Laschinger, H.K. (2015). The influence of frontline manager job strain on burnout, commitment and turnover intention: A cross-sectional study. *International Journal of Nursing Studies, Vol. 52, No. 12*, pp. 1824-1833.
22. Wronowska, G. (2015). Studenci Uniwersytetu Ekonomicznego w Krakowie - pierwsze kroki na rynku pracy. Badania ankietowe. *Europa Regionum, vol. 25*, pp. 479-494.

## SOCIAL COMPETENCES OF MEDICAL PERSONNEL – RESULTS OF AN EMPIRICAL STUDY

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**Purpose:** The main purpose of this article was to assess the level of social competence of medical personnel working in Polish healthcare entities as well as to determine relationship between social competence and selected socio-demographic and work-related factors.

**Design/methodology/approach:** A questionnaire for medical personnel of Polish healthcare entities was used to collect the data. 747 respondents took part in the research. A five-point Likert scale was adopted to assess individual social competences. In order to examine the properties of the measurement scale and the items that make it up, a reliability analysis was performed. Data were then analyzed using descriptive statistics, Kruskal-Wallis, and Mann-Whitney U tests.

**Findings:** The study shows that medical personnel rate the social competencies they possess very highly. The male and female personnel differ in their level of: ability to work in a team, commitment and responsibility, ability to communicate and build relationships, own time management effectiveness and self-education. The analyses show that the type of healthcare profession differentiates the level of social competencies.

**Practical implications:** Exploration of the social competence of physicians and medical personnel is necessary to determine the needs for specialized training to acquire social competence, and to develop programs for the acquisition of the social competence of managing complex professional and social situations.

**Social implications:** The level of competence of healthcare workers concerns all citizens. The Polish education system is mainly oriented towards professional skills training. Given the importance of social competences in the diagnosis process, treatment, and occupational functioning of health service workers, it seems appropriate to improve and develop them.

**Originality/value:** This article is based on a thorough analysis of the literature on the topic and the author's own research. In practice, this study highlights problematic areas of management in healthcare entities. It is addressed to researchers dealing with the subject and managers seeking solutions in building a team of competent medical staff.

**Keywords:** social competence, medical personnel, healthcare entities.

**Category of the paper:** Research paper.

## 1. Introduction

The unpredictable and dynamically changing organisational environment, the increasing importance of individual human potential in creating competitive advantage are just some of the elements that make the issue of competencies still an important and broad scientific research area in the discipline of management sciences (Berek, 2016). The need arises to identify areas in which healthcare entities should improve their organisational efficiency and enable the development of employed medical staff. The healthcare system is struggling with a number of management issues. To date, a long-term, coherent and evolutionary vision for its redesign has not emerged (Czauderna et al., 2019; Leggat et al., 2020; Mitosis et al., 2021).

Among the most critical problems in the health, the sector is the shortage of personnel, resulting from generational changes, an ineffective system of pre- and postgraduate education, changes in work styles, migration, obstruction of access to certain specialties by interest groups, and an insufficiently effective system of supporting deficit specialties (residencies) (Haberla, 2022). A shortage of doctors and nurses has been evident in Poland for years (Kludacz, 2015; Pomaranik, 2022). According to Eurostat data, Poland has the lowest number of practicing physicians per 1000 residents in the EU (2.4), and the number of nurses (5.1 per 1000 residents) is also among the lowest in the EU. However, official national estimates are higher - between 3.4 and 4.4 doctors per 1000 residents (Kowalska-Bobko et al., 2021).

The level of competence of healthcare workers concerns all citizens. In Poland, there is a perceived mismatch between the training of medical personnel and actual regional needs (Ministry of Funds and Regional Policy, 2022). There is an inadequate model of competence development in medical professions in public healthcare entities (Czerska et al., 2019). The Polish education system is mainly oriented towards professional skills training. Social competencies are acquired by medical graduates only when they begin their professional work (Haberla, 2022).

Realising the importance of the health workforce is an undeniable task for healthcare providers. The human factor decisively influences the overall functioning of the healthcare system. The medical industry is constantly transforming. The development of medicine boils down to the development of the competencies of those working in the healthcare system. It is thanks to the appropriate competence of medical staff that healthcare entities have the opportunity to conclude a more favourably priced contract with the National Health Fund for the provision of health and medical services. An entity employing specialist medical staff can seek to conclude a contract for the provision of highly specialised services at a higher reference level (which means a higher valuation per point by the National Health Fund). One of the conditions for entering the tender is precisely that the medical entity employs an adequate number of qualified specialist medical staff to provide the contracted health and medical services (Piszczycłowa, 2017).

The analysis of existing knowledge and research has made it possible to identify an important research gap - the paucity of analyses in the literature on the development of medical staff competencies in the public health sector.

There were two objectives in this article. The first was to examine the opinions of medical personnel of Polish healthcare entities on the social competences they possess. The other was to determine the relationship between the characteristics of the respondents (gender and profession) and the declared competences.

## 2. Competence classifications

The concept of competence emerged in 1973. The author credited with introducing the term is David Clarence McClelland (Mikuła, Pietruszka-Ortyl, 2007; Orlińska-Gondor, 2006). "Competence" is an ambiguous concept (Mikuła, 2001) and interpreted differently. Neither in management theory nor in its practice has a generally accepted definition been adopted so far. They can be understood in the context of having the authority to make decisions or as a set of knowledge, skills and experience (Serafin, 2016). An overview of the definitions of competence in relation to healthcare entities is presented in Table 1.

**Table 1.**  
*Selected definitions of the concept of competence*

| Author                                  | Definition of competence  |
|---|---|
| Boyatzis R.E.<br>(1982)                 | A set of characteristics of a person, which consists of elements characteristic of that person, such as motivation, personality traits, skills, self-assessment related to group functioning, and the knowledge that that person has acquired and uses.   |
| Butkiewicz M.<br>(1995)                 | Competence consists of skills, knowledge and responsibility, as well as the power and authority to perform work in a specific field. A competent employee is qualified to give an opinion and has the authority to act and decide.  |
| Filipowicz G.<br>(2004)                 | Competence can be defined as the individual disposition of each employee in terms of the skills, attitudes and knowledge he or she possesses, which enables that employee to perform effectively the tasks assigned by the organisation.  |
| Whiddett S.,<br>Hollyforde S.<br>(2003) | The concept of competence can be understood as: <ul style="list-style-type: none"> <li>• the ability to carry out the duties of the employment relationship effectively,</li> <li>• the ability to perform the tasks assigned by the supervisor in a manner consistent with the supervisor's intention,</li> <li>• the ability to replicate familiar patterns of behaviour.</li> </ul> Thus, competences are seen as the skills and abilities that make it possible to work in a specific position in an organisation. They can also be defined as the set of qualities necessary to perform the tasks of a job correctly.<br>Competence can also be defined as an individual set of characteristics of a given employee, consisting of skills, motivation and self-esteem. |
| Janowska Z.<br>(2001)                   | Competence is the knowledge, experience, skills and commitment of employees.  |
| Klemp G.O.<br>(1980)                    | The set of qualities of a person that enable him or her to perform job-related tasks effectively and outstandingly.   |

Cont. table 1.

|   |  |
|---|--|
| Kwiatkowski S.M.,<br>Sepkowska Z.<br>(2000) | The ability to perform the activities of an occupation well or effectively, according to the standards required for the jobs, supported by specific ranges of skills, knowledge and psycho-physical characteristics that the worker should possess.                            |
| Rostkowski T.<br>(2004)                     | These are all employee characteristics that foster the achievement of results in line with managers' expectations. Their use and development add value to the organisation.  |
| Sajkiewicz A.<br>(2002)                     | Competencies are a set of performance styles, aptitudes, professed beliefs, interests and knowledge, as well as qualities that are used in the course of the employment relationship, and their development is conducive to achieving the results desired by the organisation. |
| Skrzypczak J.<br>(1998)                     | The ability to do something, depending both on the knowledge of the messages, skills and abilities that go into it and on the degree of belief in the need to use that ability.  |

Source: Own study based on the sources included in the table.

The core of competence is knowledge and skills. Knowledge means knowledge of theories, facts, procedures related to a given position or profession. Skills are proficiency (in this case, proficiency in carrying out medical procedures). Both of these components are supported by qualifications, abilities and experience while additional components that do not form the core of the concept of competence definition are: social competence and emotional intelligence (which facilitate the execution of procedures under conditions of communication with others), psychophysical condition (which influences the preparation for work in a given position), work style (i.e. the way in which the assigned tasks and rules are carried out), values and beliefs (which influence behaviour in the workplace) (Prusaczyk et al., 2020). The author's definition of professional competence within the healthcare system refers to a set of the following characteristics of healthcare personnel: knowledge in a specific field, the ability to use this knowledge in the practice of treatment, and the willingness to use this knowledge in a manner consistent with the interests of the healthcare entity.

The literature on the subject indicates a division of competences into two key types, namely soft competences and hard competences. Hard competences refer to specific, measurable qualities necessary to perform a specific job. These qualities, due to their measurability, should be supported by documentation such as certificates, attestations or diplomas. Therefore, they can be considered as basic competences, without which it is not possible to participate in the recruitment for a specific position. Soft competences, on the other hand, are all personal, social, interpersonal and communication skills. These competences mainly revolve around the way a person behaves depending on the situation they are in. It can be said that they are the result of the summation of emotional, communication and social skills (Szmit, 2018).

A number of classifications of competences and their division into specific types, groups and categories have emerged.

Types of competence according to Michael Armstrong (Armstrong, 2007):

- general - required of persons in a specific profession or of employees in similar positions,
- specific - distinguish a particular job or defined organisational role from others,

- threshold - necessary to meet the minimum requirements in a given position,
- differentiators - characterise the behavioural traits observable in high performing employees and their absence in those who perform less well.

Types of competence according to Tomasz Rostkowski (Szczęsna, Rostkowski, 2004):

- core competencies - are common to all staff within the company. The role of core competencies is to create a uniform and consistent organisational culture within the company for all employees. They can be used in the work value survey as a basis for comparison between company employees;
- function-specific competencies - found in people working in specific organisational units of the company (e.g. accounting, sales, marketing). On their basis, comparisons can be made between the employees of a particular company department;
- role-specific competencies - otherwise known as hierarchical competencies, are required of employees depending on the role they play in the organisation (e.g. leader, strategist). They enable comparisons to be made between employees who perform specific functions at equal levels in the company's organisational hierarchy.

Competency groups according to Tony Cockerill, John Hunt and Harry Schroder (Cockerill et al., 1995):

- threshold competencies - refer to a group of managerial behaviours that indirectly influence the good results obtained by the manager,
- high performance managerial competencies - refer to a set of behaviours correlated in research with high managerial performance, e.g. concept generation competency;

Competence groups according to Aleksy Poczowski (Poczowski, 2003):

- basic - are critical to the proper performance of the job. These usually include knowledge and skills,
- distinctive - help to distinguish an effective employee from an average one. This group of competences includes motives, attitudes and values.

Competence groups according to Małgorzata Sidor-Rządkowska (Sidor-Rządkowska, 2008):

- company-specific - (corporate, organisational) - refer to the employees of an organisation. All people working for a company should have this type of competence regardless of their position,
- professional (vocational) - are closely related to the nature of the work performed. Depending on the type of work, appropriate competences are required (e.g. different from an accountant and different from a computer network administrator),
- social - refer to interpersonal contacts. In relation to a manager, this mainly means relations with subordinates, in the case of a sales representative - relations with customers, etc. To the competences of this group we can include: team cooperation, motivating employees or efficient customer service.

Categories of competence according to Justyna Kubicka-Daab (Kubicka-Daab, 2002):

- basic - refer to all persons in a specific professional group (e.g. all teachers) or functional group (e.g. all commercial directors). Core competences can also be distinguished in relation to selected organisational divisions of the company, e.g. those related to marketing,
- specific - distinguish some jobs from others, or organisational roles from each other, e.g. numerical skills needed for accounting positions.

The division of competences according to Grzegorz Filipowicz includes the area of basic competences (i.e. cognitive, social and personal competences) and executive competences (i.e. business, corporate and managerial competences) (Filipowicz, 2004):

- cognitive (problem-solving, broad-mindedness, flexibility of thinking, readiness to learn, creativity),
- business (business orientation, industry knowledge, diagnosing customer needs, sales techniques),
- social (negotiating, international familiarity, relations with superiors, relations with colleagues, written communication, communication skills, making presentations, influencing, teamwork, personal culture),
- corporate (identification with the company, customer focus, openness to change, ethics and values, foreign languages, organisational agility, professional knowledge),
- personal (action orientation, taking initiative, coping with stress, perseverance, commitment, efficiency, organising own work, conscientiousness, decision-making, setting priorities, striving for results, self-confidence),
- managerial (team building, caring for subordinates, delegating, motivating, managerial courage, leadership, organising, planning, process management, project management, strategic thinking, change management).

The most popular division found in the literature is the one distinguishing four types of competences: professional, personal, managerial and social (Lula et al., 2018). Professional competences, otherwise known as specialist competences, are closely related to the industry or the specifics of the profession. Personal competences are a set of attributes of an employee, among which we can mention their commitment or creativity. Managerial competences will undoubtedly include delegating, organising the work of a team, etc. (Róžański, 2018). The last group in the described division are social competences, which significantly affect the effectiveness of an individual's functioning (Bandach, 2013). Social competences can include: communicativeness, exerting influence, conflict resolution, building relationships, sharing knowledge and experience, and identifying with the organisation (Szmit, 2018). Thanks to social competences, it is possible to create social interactions correctly. They also influence the facilitation of cooperation, through the creation of social networks or the building of trust. They are regarded as a requirement, necessary in the process of creating



social relations, through which they form the basis for the formation of social capital (Miłaszewicz, 2015). Social competences are also the basis for formulating an effective strategy for dealing with conflicts occurring not only in private life, but also in professional life (Schuller, Demetriou, 2018).

### **3. Desirable social competences of medical staff of healthcare providers**

Specific professions require specific social competences, so no job can be performed by people who do not have the right predisposition for it and are not fully committed to it (Czerw, Borkowska, 2012; Krzysztoń, Walicka-Cupryś, 2016). Social competences are an integral part of everyone's work, but especially of people who are in constant contact with other people, such as doctors, nurses, midwives or physiotherapists, for whom creating interpersonal relations with patients is the basis of proper medical care (Matczak, 2007).

One of the professional groups in a healthcare provider whose social competences are of vital importance are nurses. The daily, constant contact with the patient forces nurses to develop not only their professional competences but also their soft competences, mainly social competences. The essence and importance of social competences in the nursing profession influences the adaptation of care to the individual needs of the patient, depending on the patient's situation (Chrzan-Rodak, Ślusarska, 2019a).

Social competences are also an essential part of doctors' work. These skills facilitate building a relationship with the patient, conducting a culturally sensitive medical history, foster the performance of diagnostic and therapeutic tasks and allow taking care of one's own psychological well-being (Zarek, Wyszadko, 2018).

Doctors and nurses should be able to cooperate among themselves and with other healthcare professionals, establish and maintain respect between staff and patients, show tolerance towards different views, cultures and peoples, act with empathy and continuously improve their knowledge. In addition, doctors should be more involved in scientific activities than other professional groups of healthcare providers. Thus, the following desirable competencies of medical personnel in healthcare entities can be distinguished: patient-centredness, inspiring trust, teamwork, ability to remove fears and inspire hope, leadership, communication, planning and organisation, stimulating the development of others, problem-solving skills (Epstein, Hundert, 2002; Sokołowska, 1986).

It should be noted that the formation of social competences in both the professional group of doctors and nurses starts as early as the university stage.

The Minister of Education and Science, in consultation with the Minister of Health, has signed a decree amending the decree on the standards of training to prepare for the profession of doctor, dentist, pharmacist, nurse, midwife, laboratory diagnostician,

physiotherapist and paramedic in the part concerning the profession of doctor and dentist. The revised standards will be effective from the 2024/2025 academic year. The change in regulations is due to new challenges facing modern medical higher education, to ensure the highest possible quality of education (table 2).

**Table 2.**

*Social competences listed in the Regulation of the Minister of Education and Science of 29 September 2023 amending the Regulation on standards of education preparing for the professions of doctor, dentist, pharmacist, nurse, midwife, laboratory diagnostician, physiotherapist and paramedic*

| Standards of training to prepare for the profession   |   |
|---|---|
| Doctor  | Nurse   |
| <b>General learning outcomes</b>  |   |
| In terms of social competence, the graduate is ready to   |   |
| 1) establish and maintain deep and respectful contact with the patient and show understanding for worldview and cultural differences;<br>2) be guided by the welfare of the patient;<br>3) respect medical confidentiality and patient rights;<br>4) take action based on ethical principles, with an awareness of the social determinants and limitations of the disease;<br>5) perceive and recognise their own limitations, make self-assessments of deficits and learning needs;<br>6) promote healthy behaviour;<br>7) use objective sources of information;<br>8) formulate conclusions from their own measurements or observations;<br>9) implement the principles of professional camaraderie and teamwork, including with representatives of other health professions, and in a multicultural and multinational environment;<br>10) form opinions on various aspects of professional activity;<br>11) accept the responsibility associated with decisions taken during professional activities, including in terms of the safety of themselves and others. | 1) be guided by the welfare of the patient, respect the dignity and autonomy of those entrusted to their care, show understanding of worldview and cultural differences, and show empathy in their relationship with the patient and his family;<br>2) Compliance with patient rights;<br>3) Independently and diligently perform the profession in accordance with ethical principles, including adherence to moral values and duties in patient care;<br>4) bear responsibility for professional activities performed;<br>5) to consult experts in case of difficulties in solving the problem on their own;<br>6) Anticipate and take into account factors that influence their own and the patient's reactions;<br>7) Recognizing and recognizing their own limitations in terms of knowledge, skills and social competence, and making self-assessments of deficits and educational needs. |

Source: Regulation of the Minister of Education and Science of 29 September 2023 amending the Regulation on standards of education preparing for the professions of doctor, dentist, pharmacist, nurse, midwife, laboratory diagnostician, physiotherapist and paramedic

The curricular implementation of social competences by universities and the emphasis on their implementation is a great success and such aspirations should be adopted as obligatory, not only because of the changes introduced in connection with the National Qualifications Framework. There are several reasons for this:

- Polish students judge themselves to be socially incompetent in many aspects, such as dealing with difficult and unexpected situations, being the object of attention and evaluation, being open to society, being able to help, etc. (Jagiełło-Rusiłowski, 2011).

- For years, experts from the European Union have been stressing the crucial importance of social competences, which are indispensable for a citizen of modern Europe. The DeSeCo Project (the acronym of Definition and Selection of Competencies: Theoretical and Conceptual Foundations) assumes their indispensable role for personal fulfilment and development, being an active citizen, as well as for social integration and employment. The Lisbon Declaration recognised social competences as key for citizens of the Member States obliged to develop them in the education and social support system (Seweryn, Spodaryk, 2014).
- Compared to other European countries, Poland performs very badly in the rankings in terms of so-called soft capital. Our society has intellectual capital, but lacks creativity, social trust, ethics and civic activity (Czapiński, Panek, 2009).

Developments in science and technology are making it possible to understand illnesses better, to diagnose and treat them more accurately, but it is still communication skills that are among the basic abilities that healthcare professionals should acquire and develop. Good interpersonal communication results not only in patients' satisfaction with their interactions with medical staff, but, above all, has a positive impact on the process of treatment itself and supports the patient in adopting the right attitude towards the disease. In turn, the basis for a good staff-patient relationship is good communication within the therapeutic team, as one of the factors counteracting professional burnout.

#### **4. Methods**

A questionnaire for healthcare professionals was used to collect data. A total of 747 respondents participated in the research. The survey was conducted in 2022. Participation in the study was voluntary, and confidentiality and anonymity were ensured. A five-point Likert scale was adopted to assess social competences. A scale was used from 1 (strongly disagree) to 5 (strongly agree). The collected data were analysed with the SPSS 17 software. In order to examine the properties of the measurement scale and the items that make it up, a reliability analysis was performed. The total (combined) result of social competence did not have a normal distribution, as determined by the Shapiro–Wilk test. Data were then analyzed using descriptive statistics, Kruskal-Wallis tests and Mann-Whitney U tests. In all tests, p values less than 0,05 were interpreted as statistically significant.

## 5. Results

### 5.1. Characteristics of respondents

The following socio-demographic characteristics were assessed in the study to find out the description of the respondents and whether they were well suited for the study: gender, age, healthcare profession, marital status and working experience. The results are as shown in Table 3.

**Table 3.**  
*Socio-demographic characteristics of the study participants (N = 747)*

| Construct             |                     | Frequency (N) | Percent (%) |
|-----------------------|---------------------|---------------|-------------|
| Gender                | Male                | 523           | 70.0        |
|                       | Female              | 224           | 30.0        |
|                       | Total               | 747           | 100.0       |
| Age category          | Less than 30 years  | 62            | 8.3         |
|                       | Between 30-40 years | 139           | 18.6        |
|                       | Between 41-50 years | 212           | 28.4        |
|                       | Between 51-60 years | 291           | 39.0        |
|                       | Above 60 years      | 43            | 5.8         |
|                       | Total               | 747           | 100.0       |
| Years of experience   | Between 1-5 years   | 84            | 11.2        |
|                       | Between 6-10 years  | 49            | 6.6         |
|                       | Between 11-15 years | 94            | 12.6        |
|                       | Between 16-25 years | 126           | 16.9        |
|                       | Above 25 years      | 394           | 52.7        |
|                       | Total               | 747           | 100.0       |
| Marital status        | Never married       | 84            | 11.2        |
|                       | Married             | 561           | 75.1        |
|                       | Widowed             | 39            | 5.2         |
|                       | Divorced/separated  | 63            | 8.4         |
|                       | Total               | 747           | 100.0       |
| Healthcare profession | Doctor              | 234           | 31.3        |
|                       | Doctor dentist      | 63            | 8.4         |
|                       | Nurse               | 323           | 43.2        |
|                       | Midwife             | 47            | 6.3         |
|                       | Other               | 80            | 10.7        |
|                       | Total               | 747           | 100.0       |

Source: Own elaboration.

The study findings indicate that over half (70.0%) of the respondents in the study were female; and 30.0% were male. The findings therefore show that there was not relative gender balance among the staff of Polish healthcare entities as the number of female and male respondents was not close. Almost half (39.0%) of the respondents were aged between 51 and 60 years. The mean age was 47 years. It can therefore be concluded that majority of the staff in Polish healthcare entities were not in their youth.

The study sought to establish the period under which the respondents have worked with the healthcare entities. This was meant to establish whether the respondents can articulate the issues in this study relating to working in Polish healthcare entities. The study findings indicate that

majority (52.7%) of the respondents in the study had a working experience of above 25 years, 16.9% had a working experience of between 16 to 25 years, 12.6% had a working experience of between 11 to 15 years, 11.2% had a working experience of between 1 to 5 years, 6.6% had a working experience of between 6 to 10 years. The fact that respondents had worked between 1 to 5 years and above illustrated that they were able to articulate the issues in this study.

Respondents indicated their marital status. Married people predominated (561 respondents, i.e. 75.1% of all respondents). Single individuals accounted for 11.2% of respondents, divorcees for 8.4% of the total, and widows and widowers for 5.2% of all respondents.

Respondents with a medical function accounted for 39.7% of the total number of respondents; these were doctors (234 people) and dentists (63 people). The remaining group consisted of non-physician respondents (60.3%). The survey involved 323 nurses, 47 midwives and 80 representatives of other medical professions (the largest group were paramedics and laboratory diagnosticians).

## 5.2. Analysis of medical personnel competences

In order to investigate the properties of the measurement scale and the items constituting it in the survey questionnaire for personnel of healthcare entities, a reliability analysis was conducted. The exact values obtained from this analysis are shown in Table 4 and Figure 1.

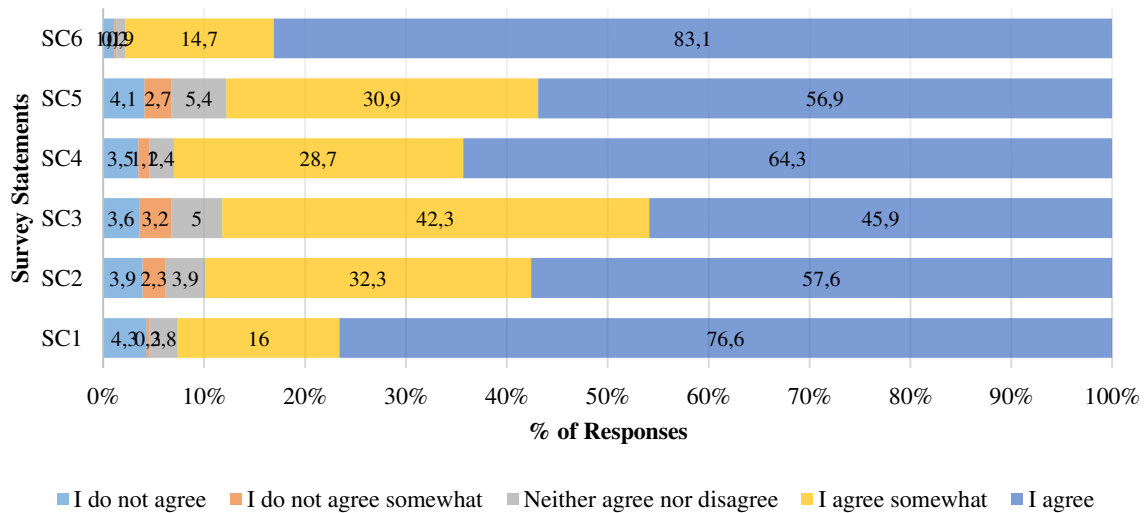
**Table 4.**

*Analysis of the reliability of the dimensions included in the survey questionnaire addressed to personnel of healthcare entities and descriptive statistics of survey variables (N = 747)*

| Construct                              | Variable  | Mean | Standard Deviation |
|--|---|------|--------------------|
| Social competences<br>$\alpha = 0,759$ | SC1. I can work in a team   | 4.60 | 0.909              |
|  | SC2. I manage my time effectively                                 | 4.37 | 0.957              |
|  | SC3. Self-education is my strength                                | 4.27 | 0.953              |
|  | SC4. I have communication and social relationship-building skills | 4.49 | 0.884              |
|  | SC5. I am an assertive person and able to work under stress       | 4.38 | 0.995              |
|  | SC6. I demonstrate commitment and responsibility                  | 4.79 | 0.569              |

Source: Own elaboration.

Cronbach's alpha values greater than 0,70 indicate a high level of reliability of the scale (Azhar et al., 2022). The significance of the individual variables assumes a very low level (less than 0.001). This means that the null hypothesis of the Shapiro-Wilk test, which states that, the distribution of the variables is normal - cannot be accepted. Thus, the distributions of the variables described above are not normal.



**Figure 1.** Distribution of survey responses.

Source: Own elaboration.

The study shows that medical personnel rate the social competencies they possess very highly. The following deserve special mention: ability to work in a team (SC1:  $M = 4.60$ ;  $SD = 0.909$ ), commitment and responsibility (SC6:  $M = 4.79$ ;  $SD = 0.569$ ), ability to communicate and build relationships (SC4:  $M = 4.49$ ;  $SD = 0.884$ ). Respondents rated their own time management effectiveness (SC2:  $M = 4.37$ ;  $SD = 0.957$ ), assertiveness and ability to work under stress (SC5:  $M = 4.38$ ;  $SD = 0.995$ ) and self-education (SC3:  $M = 4.27$ ;  $SD = 0.953$ ) slightly lower.

### 5.3. Factors differentiating the social competences of medical personnel

It was then examined whether ratings of individual social competences differed according to selected demographic and social characteristics. Effects of the demographic variables viz., gender and healthcare profession, were tested using nonparametric tests. Gender was analyzed with the help of Mann-Whitney U-test (Table 5) whereas Kruskal Wallis H-tests was used to analyze of other demographic variable — healthcare profession (Tables 6 and 7 respectively) (Wądołowska, 2013; Mondal et al., 2022).

Initially, the Mann-Whitney U-test (Table 5) shows that of the six types of social competences, the difference between the mean ranks of five responses, i.e., ability to work in a team (SC1:  $Z = -5.754$ ;  $p < 0.001$ ), own time management effectiveness (SC2:  $Z = -3.712$ ;  $p = 0.001$ ), self-education (SC3:  $Z = -3.239$ ;  $p = 0.001$ ), ability to communicate and build relationships (SC4:  $Z = -2.837$ ;  $p = 0.005$ ), commitment and responsibility (SC6:  $Z = -4.408$ ;  $p < 0.001$ ), were found to be significant between male and female respondents under the study.

**Table 5.***Differences the social competences of medical personnel by gender*

| Variable  | Gender           |      |                |      | Z      | p      | $\eta^2$ |
|---|------------------|------|----------------|------|--------|--------|----------|
|   | Female (n = 523) |      | Male (n = 224) |      |        |        |          |
|   | Mean rank        | Me   | Mean rank      | Me   |        |        |          |
| SC1. I can work in a team   | 395.98           | 5.00 | 322.67         | 5.00 | -5.754 | <0.001 | 0.08     |
| SC2. I manage my time effectively                                 | 390.88           | 5.00 | 334.58         | 5.00 | -3.712 | 0.001  | 0.06     |
| SC3. Self-education is my strength                                | 389.22           | 4.00 | 338.46         | 4.00 | -3.239 | 0.001  | 0.04     |
| SC4. I have communication and social relationship-building skills | 386.36           | 5.00 | 345.14         | 5.00 | -2.837 | 0.005  | 0.05     |
| SC5. I am an assertive person and able to work under stress       | 378.68           | 5.00 | 363.08         | 5.00 | -1.021 | 0.307  | 0.02     |
| SC6. I demonstrate commitment and responsibility                  | 388.80           | 5.00 | 339.45         | 5.00 | -4.408 | <0.001 | 0.04     |

Note. Me – median; Z – statistics of the Mann–Whitney u test,  $\eta^2$  – eta square, a measure of the strength of the association; p – an estimate of the probability that the observed difference between groups is random. The result of the analysis is statistically significant if the p-value is less than the assumed alpha threshold, which is 0.05.

Source: Own elaboration.

The value of  $\eta^2$  (eta square) indicates the percentage of the dependent variable variation explained by the independent variable. The higher its value, the greater the variation is (more substantial effect). It is assumed that: around  $\eta^2 < 0.06$ , there is a weak effect, between  $0.06 < \eta^2 < 0.14$ , there is a moderate effect and  $\eta^2 > 0.14$ , there is a strong effect (Richardson, 2011).

Null hypothesis was rejected in these five cases and in the case of the SC5 variable null hypothesis were accepted. So the rejected hypothesis shows that the male and female personnel differ in their level of: ability to work in a team (moderate effects), commitment and responsibility (weak effect), ability to communicate and build relationships (weak effect), own time management effectiveness (moderate effects) and self-education (weak effect). Thus, the monitored group of women perceives the own social competences better than the monitored group of men.

Next, Kruskal-Wallis tests were performed to test whether healthcare profession differentiated the social competences (table 6).

**Table 6.***Comparison of dimensions of the social competences according to healthcare profession*

| Variable                          | Healthcare profession   | Mean rank | Me   | H(4)   | p      | $\eta^2$ |
|-----------------------------------|-------------------------|-----------|------|--------|--------|----------|
| SC1. I can work in a team         | doctor (n = 234)        | 350.82    | 5.00 | 33.717 | <0.001 | 0.06     |
|                                   | doctor dentist (n = 63) | 316.00    | 5.00 |        |        |          |
|                                   | nurse (n = 323)         | 410.70    | 5.00 |        |        |          |
|                                   | midwife (n = 47)        | 333.79    | 5.00 |        |        |          |
|                                   | other (n = 80)          | 362.94    | 5.00 |        |        |          |
| SC2. I manage my time effectively | doctor (n = 234)        | 344.03    | 5.00 | 19.870 | 0.001  | 0.06     |
|                                   | doctor dentist (n = 63) | 312.27    | 4.00 |        |        |          |
|                                   | nurse (n = 323)         | 396.87    | 5.00 |        |        |          |
|                                   | midwife (n = 47)        | 404.71    | 5.00 |        |        |          |
|                                   | other (n = 80)          | 399.88    | 5.00 |        |        |          |

Cont. table 6.

|   |                                 |        |      |        |                  |      |
|---|---------------------------------|--------|------|--------|------------------|------|
| SC3. Self-education is my strength                                | doctor ( <i>n</i> = 234)        | 359.81 | 4.00 | 21.216 | <b>&lt;0.001</b> | 0.04 |
|   | doctor dentist ( <i>n</i> = 63) | 281.43 | 4.00 |        |                  |      |
|   | nurse ( <i>n</i> = 323)         | 392.07 | 4.00 |        |                  |      |
|   | midwife ( <i>n</i> = 47)        | 422.72 | 5.00 |        |                  |      |
|   | other ( <i>n</i> = 80)          | 386.84 | 5.00 |        |                  |      |
| SC4. I have communication and social relationship-building skills | doctor ( <i>n</i> = 234)        | 346.23 | 5.00 | 10.183 | <b>0.037</b>     | 0.03 |
|   | doctor dentist ( <i>n</i> = 63) | 384.10 | 5.00 |        |                  |      |
|   | nurse ( <i>n</i> = 323)         | 394.33 | 5.00 |        |                  |      |
|   | midwife ( <i>n</i> = 47)        | 381.49 | 5.00 |        |                  |      |
|   | other ( <i>n</i> = 80)          | 360.80 | 5.00 |        |                  |      |
| SC5. I am an assertive person and able to work under stress       | doctor ( <i>n</i> = 234)        | 371.71 | 5.00 | 4.413  | 0.353            | 0.02 |
|   | doctor dentist ( <i>n</i> = 63) | 338.79 | 5.00 |        |                  |      |
|   | nurse ( <i>n</i> = 323)         | 383.93 | 5.00 |        |                  |      |
|   | midwife ( <i>n</i> = 47)        | 344.87 | 4.00 |        |                  |      |
|   | other ( <i>n</i> = 80)          | 385.43 | 5.00 |        |                  |      |
| SC6. I demonstrate commitment and responsibility                  | doctor ( <i>n</i> = 234)        | 372.46 | 5.00 | 12.740 | <b>0.013</b>     | 0,04 |
|   | doctor dentist ( <i>n</i> = 63) | 328.32 | 5.00 |        |                  |      |
|   | nurse ( <i>n</i> = 323)         | 390.06 | 5.00 |        |                  |      |
|   | midwife ( <i>n</i> = 47)        | 367.01 | 5.00 |        |                  |      |
|   | other ( <i>n</i> = 80)          | 353.74 | 5.00 |        |                  |      |

Note. The following were included as other types of healthcare profession: paramedics and laboratory diagnosticians.

Me - median, H - Kruskal-Wallis H test;  $\eta^2$  - eta square, a measure of the strength of the association; p - an estimate of the probability that the observed difference between groups is random. The result of the analysis is statistically significant if the *p-value* is less than the assumed alpha threshold, which is 0.05.

Source: Own elaboration.

The social competences that differ by type of healthcare profession (for which  $p < 0.05$ ) are ability to work in a team (moderate effects), commitment and responsibility (weak effect), ability to communicate and build relationships (weak effect), own time management effectiveness (moderate effects) and self-education (weak effect).

The analyses show that the type of healthcare profession differentiates the level of social competencies. In order to investigate the exact differences, post hoc tests with Bonferroni correction were performed, the results of which are presented in Table 7.

**Table 7.**

*The significance value of pairwise comparisons with Bonferroni correction for the social competences according to healthcare profession*

| Variable                          | Healthcare profession | 1            | 2            | 3            | 4     |
|-----------------------------------|-----------------------|--------------|--------------|--------------|-------|
| SC1. I can work in a team         | 1. Doctor             | -            |              |              |       |
|                                   | 2. Doctor dentist     | 1.000        | -            |              |       |
|                                   | 3. Nurse              | <b>0.001</b> | <b>0.001</b> | -            |       |
|                                   | 4. Midwife            | 1.000        | 1.000        | <b>0.020</b> | -     |
|                                   | 5. Other              | 1.000        | 0.807        | 0.165        | 1.000 |
| SC2. I manage my time effectively | 1. Doctor             | -            |              |              |       |
|                                   | 2. Doctor dentist     | 1.000        | -            |              |       |
|                                   | 3. Nurse              | <b>0.012</b> | <b>0.012</b> | -            |       |
|                                   | 4. Midwife            | 0.457        | 0.116        | 1.000        | -     |
|                                   | 5. Other              | 0.232        | 0.062        | 1.000        | 1.000 |



Cont. table 7.

|   |                   |              |              |       |       |
|---|-------------------|--------------|--------------|-------|-------|
| SC3. Self-education is my strength                                | 1. Doctor         | -            |              |       |       |
|   | 2. Doctor dentist | <b>0.049</b> | -            |       |       |
|   | 3. Nurse          | 0.555        | <b>0.001</b> | -     |       |
|   | 4. Midwife        | 0.449        | <b>0.002</b> | 1.000 | -     |
|   | 5. Other          | 1.000        | <b>0.014</b> | 1.000 | 1.000 |
| SC4. I have communication and social relationship-building skills | 1. Doctor         | -            |              |       |       |
|   | 2. Doctor dentist | 1.000        | -            |       |       |
|   | 3. Nurse          | <b>0.021</b> | 1.000        | -     |       |
|   | 4. Midwife        | 1.000        | 1.000        | 1.000 | -     |
|   | 5. Other          | 1.000        | 1.000        | 1.000 | 1.000 |
| SC6. I demonstrate commitment and responsibility                  | 1. Doctor         | -            |              |       |       |
|   | 2. Doctor dentist | 0.266        | -            |       |       |
|   | 3. Nurse          | 1.000        | <b>0.014</b> | -     |       |
|   | 4. Midwife        | 1.000        | 1.000        | 1.000 | -     |
|   | 5. Other          | 1.000        | 1.000        | 0.381 | 1.000 |

Note. The following were included as other types of healthcare profession: paramedics and laboratory diagnosticians.

Source: Own elaboration.

It has been shown that:

- The social competence dimension related to the ability to work in a team was at a higher level in nurses than in doctors, dentists and midwives. Other comparisons are not statistically significant.
- The social competence dimension related to the ability to manage time effectively was at a higher level in nurses than in doctors and dentists. Other comparisons are not statistically significant.
- The social competence dimension related to the ability to self-educate was at a higher level in nurses than in the other groups (except for midwives). Other comparisons are not statistically significant.
- The social competence dimension related to the ability to communicate and build social relationships was at a higher level in nurses than in doctors. Other comparisons are not statistically significant.
- The social competence dimension related to commitment and responsibility was at a higher level in nurses than in dentists. Other comparisons are not statistically significant.

## 6. Discussion

The functioning of people in the work environment, as well as their satisfaction with professional achievements are highly determined by their social competence, attitudes towards work, strategies adopted to cope with problems, and an emotional stance on the professional roles (Rongińska, Gaida, 2012).

Mroczek et al. (2017) describe relationships between the level of social competence and work-related behaviors in a group of physicians, nurses and paramedics. The majority of the healthcare workers (62.7%) had average general social competence, and 15.3% had low competence. High levels of general social competence and A competencies (which refers to attaining one's own goals and satisfying needs through persuasion, and the ability to influence other and resist the influence of others which refers to attaining one's own goals and satisfying needs through persuasion, and the ability to influence other and resist the influence of others), I competencies (which refers to competence determining the effectiveness of behaviors in situations of close interpersonal contact with patients, listening to patients, showing understanding and empathy for their fears, and tolerance for their impatience and dissatisfaction with therapeutic effects) and SE competencies (which refers to being an object of attention and potential appraisal from many people) were observed in every sixth medical worker.

A study of medical staff on social competence using the Social Competence Questionnaire by Matczak (2007) was conducted by Zaborniak-Sobczak, Walicka-Cupryś and Ćwirlej-Sozańska (2012). The results of their research were used to develop the first publication on competence assessment among physiotherapists. The authors showed that physiotherapists scored high on social competence (Matczak, 2007; Zaborniak-Sobczak et al., 2012). Also in the present study, physiotherapists scored high on social competence both in their self-assessment and in the assessment of their patients. However, it should be noted that the physiotherapists' self-assessment scores were slightly lower than the patients' scores. Thus, it is easy to see that the physiotherapists were more critical of themselves. Therapists and their patients felt that physiotherapists were able to behave impeccably in intimate and close interpersonal situations. At the same time, patients rated the social competences of physiotherapists very highly, including, among other things, their assertiveness, which shows that patients have a high degree of trust in their physiotherapists.

Physiotherapists fulfil their professional role in teamwork (Matczak, 2007). Therefore, they should be distinguished by certain qualities necessary to be effective in carrying out their tasks: agreeableness - reliable and appropriate cooperation, extraversion - being communicative, emotional stability - not succumbing to emotions and stress, conscientiousness - being dutiful, accurate and responsible. These are known as predictors of performance Traits such as acceptance, tolerance, caring and sincerity and openness also play an important role in the physiotherapist's work, which inspire trust and confidence in the patient (Jones, Day, 1997).

Interesting research results were obtained by Rutkowska (2005), who assessed social competences in a group of nurses. According to the author, they received an average rating, and it is worth noting that this profession requires constant interpersonal contact. A study conducted by the Chrzan-Rodak team (2019b), also showed that nurses represent low and average levels of social competence. In contrast, our own research showed high levels of social competence among medical staff. It should be noted that these studies were conducted in an interval of several years. Despite the significant change in the perception of their own social competence,

there is a further need for research on social competence among nurses and implementation of training programmes that will help them develop higher levels of social skills.

The analyses show that the type of healthcare profession differentiates the level of social competencies. It should be noted that in the nursing profession social competences play an important role due to the regulation of processes that involve self-creation (Bandach, 2013). Thanks to them, it becomes possible to improve interpersonal relationships, which is determined not only by efficient communication, but also by the process of getting to know other people or influencing them. In addition, having highly developed social competences has a positive impact on reducing work-related stress levels (Smarżewska, 2019). Rutkowska also points out that developed social competences contribute to reducing the probability associated with early exit from the profession (Rutkowska, 2012). Social competences can significantly contribute to inhibiting burnout, especially in the nursing profession. It is known that the longer the length of service a person has, the greater the risk of professional burnout occurring. However, the literature indicates that social competences provide a kind of protection against this syndrome (Chrzan-Rodak et al., 2019b).

Another aspect investigated in relation to social competence was differences in self-assessment according to age and gender. Walicka-Cupryś and Smolarz (2017) found no statistically significant age-related differences in their study, while gender was a differentiating variable in the assessment of physiotherapists' level of social competence. Men assessing themselves on the Social Competence Questionnaire scored high, while women scored average. It is possible that men are more decisive, more precise in their actions and physically strong, which has an impact on the performance of certain treatments or therapeutic exercises.

In our own study, the gender dependence of the self-assessment of one's social competences was confirmed. However, the monitored group of women perceives their own social competences better than the monitored group of men. It should be noted that the author included in the study not only physiotherapists, but also doctors, dentists, nurses and midwives.

In a study conducted by Rutkowska (2005), it was interesting to note the dependence of the social competences held by the author on age in a group of nurses. Respondents aged between 31 and 38 years were characterised by higher competences than younger or older nurses. In her study, she showed that the seniority or place of work of the medical staff did not significantly differentiate the self-assessment of social competences, which turned out to be consistent with the results of studies by other authors (Zaborniak-Sobczak et al., 2012). However, it is worth noting that seniority is a quite significant factor influencing the consolidation and learning of various skills, including interpersonal skills. Low levels of competence can be expected from physicians with less seniority, not belonging to scientific societies, not involved in students' education, working in only one place, and not participating in third cycle degree studies (Tychmanowicz, Kuśpit, 2012).

Walicka-Cupryś and Smolarz (2017) noted that the educational background of medical staff did not differentiate their self-assessment in relation to their level of social competence, whereas in the study presented in Zaborniak-Sobczak et al. (2012) such a difference was found. This may imply that social competences are shaped with the development of professional skills and numerous situations requiring appropriate interpersonal behaviour when working with patients during practice.

Pursuing the medical profession with only substantive qualifications without appropriate interpersonal skills does not guarantee the expected results (Brzozowska et al., 2013). Interpersonal competences are a condition for effectiveness and professional success. Their deficit prevents the development of skills and the proper performance of professional functions. Everyone working should improve their interpersonal competences in order to be able to solve problems that arise when working with patients. Social skills can be developed through social training or natural training, based on everyday professional experience, involving drawing constructive conclusions from various situations arising during work, as well as training in the nature of specialised training interventions (Smółka, 2008b). Correct assessment of the situation, logical thinking and making decisions adequate to the situation is the basis for obtaining the desired work results, therefore it is worth using various educational methods, which play a very important role in the development of social competences (Smółka, 2008a). Efficient functioning at work depends on social skills (Chrzan-Rodak et al., 2023). Highly developed social competences are the basis for practising this profession (Hebda, Madejski, 2004).

## 7. Summary

This study aimed to examine the medical personnel perception of the own social competences. This study assessed social competences, particularly work in a team, manage time effectively, self-education, communication and social relationship-building skills, assertive and work under stress, commitment and responsibility.

The study showed that medical personnel rate the social competencies they possess very highly. It has also been shown that the way medical personnel perceive the own social competences varies depending on the type of profession and gender.

Several practical implications can be derived from the results presented in this study. It seems that the most important conclusion is that exploration of the social competence of physicians and medical personnel is necessary to determine the needs for specialized training to acquire social competence, and to develop programs for the acquisition of the social competence of managing complex professional and social situations.

Polish higher education should support and recommend intensive implementation of social competence education and promote its importance in the entire catalogue of educational outcomes. In addition, the academic community's knowledge of social competences in Poland should be deeper and more forward-looking, and the understanding of the concept itself should be broader. An additional argument for raising the profile of social competences, not only in relation to Polish society, but to medical science, is the alarming data on the level of social trust in health care in Poland, including ambulance service and hospital emergency departments (Seweryn, Spodaryk, 2014). Patients expect medical professionalism from healthcare entities, elements of which should be included in the field of social competences.

In conclusion, it should be emphasised once again that it is social competence that is a prerequisite for medical personnel to do their job well, and it is undoubtedly important for the self-esteem of the latter to know that they are doing their profession well, thus helping the sick.

## References

1. Armstrong, M. (2007). *Zarządzanie zasobami ludzkimi*. Warszawa: Wolters Kluwer Polska, p. 245.
2. Azhar, Y., Erdiansyah, Z., Rudiman, R. (2022). Validation of Immune Status Questionnaire (ISQ) in Indonesian Bahasa Language as a Simple Sssessment of Perceived Immune Status. *Asian Pacific Journal of Cancer Prevention, Vol. 23, Iss. 10*, pp. 3261-3263, doi: 10.31557/APJCP.2022.23.10.3261
3. Bandach, M. (2013). Social skills training as a form of social increasing competence. *Economics and Management, Vol. 5, No. 4*, pp. 82-97, doi: 10.12846/j.em.2013.04.06
4. Berek, J. (2016). Identyfikacja pożądanych kompetencji pracowników na przykładzie przedsiębiorstw branży lotniczej regionu bielsko-bialskiego – część II. *Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie, Vol. 30, No. 2*, pp. 57-68, doi: 10.25944/znmwse.2016.02.5768.
5. Boyatzis, R.E. (1982). *The Competent Manager: A Model for Effective Performance*. New York: John Wiley and Sons. Retrieved from: <https://babel.hathitrust.org/cgi/pt?id=uc1.b4906221&seq=33>, 17.05.2024.
6. Brzozowska, E., Andrzejewski, W., Kassolik, K., Wilk, I. (2013). Kompetencje i predyspozycje psychofizyczne do wykonywania zawodu masażysty. *Rehabilitacja w praktyce, Iss. 1*, pp. 52-53.
7. Butkiewicz, M. (1995). *Struktura modelu polskich standardów kwalifikacyjnych*. Radom/Warszawa: Wydawnictwo Edukacja i Praca, pp. 29-30.

8. Chrzan-Rodak, A., Ślusarska, B. (2019a). Inteligencja emocjonalna i kompetencje społeczne - założenia teoretyczne i znaczenie dla praktyki pielęgniarstwa. *Pielęgniarstwo Polskie, Vol. 71, Iss. 1*, pp. 80-85, doi: 10.20883/pielpol.2019.11
9. Chrzan-Rodak, A., Ślusarska, B., Nowicki, G., Ogórek, M., Zarzycka, D., Niedorys, B., Dziedzic, E. (2019b). Selected socio-demographic and work-related determinants of the social competence of professionally active nurses. *Pielęgniarstwo XXI wieku [Nursing in the 21st Century], Vol. 18, Iss. 1*, doi: 10.2478/pielxxiw-2019-0006
10. Chrzan-Rodak, A., Nowicki, G.J., Schneider-Matyka, D., Grochans, E., Ślusarska, B. (2023). Impact of the Empathic Understanding of People and Type D Personality as the Correlates of Social Skills of Primary Health Care Nurses: A Cross-Sectional Study. *International Journal of Environmental Research and Public Health. Vol. 20, No. 1*, p. 201, doi: 10.3390/ijerph20010201
11. Cockerill, T., Hunt, J., Schroder, H. (1995). Managerial Competencies: Fact or Fiction? *Business Strategy Review, Vol. 6, No. 3*, pp. 1-12, doi: 10.1111/j.1467-8616.1995.tb00095.x
12. Czapiński, J., Panek, T. (2009). *Diagnoza społeczna*. Warszawa: PrintQIT. Retrieved from: [http://www.diagnoza.com/pliki/raporty/Diagnoza\\_raport\\_2009.pdf](http://www.diagnoza.com/pliki/raporty/Diagnoza_raport_2009.pdf), 20.05.2024.
13. Czauderna, P., Gałązka-Sobotka, M., Górski, P., Hryniewiecki, T. (2019). *Strategiczne kierunki rozwoju systemu ochrony zdrowia w Polsce, Wyniki ogólnonarodowej debaty o kierunkach zmian w ochronie zdrowia*. Warszawa: Ministerstwo Zdrowia. Retrieved from: [http://oipip.elblag.pl/wp-content/uploads/2019/07/Wsp%C3%B3lnie-dla-zdrowia\\_dokument-podsumowuj%C4%85cy.pdf](http://oipip.elblag.pl/wp-content/uploads/2019/07/Wsp%C3%B3lnie-dla-zdrowia_dokument-podsumowuj%C4%85cy.pdf), 17.05.2024.
14. Czerska, I., Trojanowska, A., Korpak, T. (2019). Przyszłość opieki zdrowotnej w Polsce – nowe horyzonty. In: W. Nowak, K. Szalotka (Eds.), *Zdrowie i style życia. Wyzwania ekonomiczne i społeczne* (pp. 197-214). Wrocław: E-Wydawnictwo. Prawnicza i Ekonomiczna Biblioteka Cyfrowa. Wydział Prawa, Administracji i Ekonomii Uniwersytetu Wrocławskiego, doi: 10.34616/23.19.120
15. Czerw, A., Borkowska, A. (2012). Zróżnicowanie struktury wartości realizowanych w pracy wśród pracowników zawodów z misją społeczną. *Czasopismo Psychologiczne, Vol. 18, No. 2*, pp. 203-209. Retrieved from: <http://www.czasopismopsychologiczne.pl/files/articles/2012-18-zrnicowanie-struktury-wartoci-realizowanych-w-pracy-wrd-pracownikw-zawodw-z-misj-spoeczn.pdf>, 12.06.2024.
16. Epstein, R.M., Hundert, E. (2002). Defining and Assessing Professional Competence. *JAMA, Vol. 287, No. 2*, pp. 226-235, doi: 10.1001/jama.287.2.226
17. Filipowicz, G. (2004). *Zarządzanie kompetencjami zawodowymi*. Warszawa: PWE, p. 38.
18. Haberla, M. (2022). The demand for competence and qualification of medical personnel in the light of the results of empirical studies. *Zeszyty Naukowe Politechniki Śląskiej, Organizacja i Zarządzanie, No. 166*, pp. 319-331, doi: 10.29119/1641-3466.2022.166.21.

19. Hebda, P., Madejski, J. (2004). *Zawód z pasją nauka, praca, kariera*. Bielsko-Biała: Park, p. 393.
20. Jagiełło-Rusiłowski, A. (2011). *Fiński model kształcenia i oceniania kompetencji społecznych – inspiracje dla polskich interesariuszy szkolnictwa wyższego*. Warszawa: Instytut Badań Edukacyjnych. Retrieved from: [https://biblioteka-krk.ibe.edu.pl/opac\\_css/doc\\_num.php?explnum\\_id=305](https://biblioteka-krk.ibe.edu.pl/opac_css/doc_num.php?explnum_id=305), 4.05.2024.
21. Janowska, Z. (2001). *Zarządzanie zasobami ludzkimi: wyzwanie XXI wieku*. Warszawa: PWE.
22. Jones, K., Day, J.D. (1997). Discrimination of two aspects of cognitive-social intelligence from academic intelligence. *Journal of Educational Psychology*, Vol. 89, No. 3, pp. 486-497, doi: 10.1037/0022-0663.89.3.486
23. Klemp, G.O. Jr. (1980). *The Assessment of Occupational Competence*. Washington: National Institute of Education.
24. Kludacz, M. (2015). Problem dostępności zasobów ludzkich w polskim systemie ochrony zdrowia na tle innych krajów Organizacji Współpracy Gospodarczej i Rozwoju. *Economics and Management*, Vol. 7, No. 1(7), pp. 9-31, doi: DOI:10.12846/j.em.2015.01.01
25. Kowalska-Bobko, I., Gałązka-Sobotka, M., Zabdyr-Jamróż, M., Badora-Musiał, K., Piotrowska K. (2021). *Sustainability and resilience in the Polish health system, Partnership for Health System Sustainability and Resilience*. London School of Economics and Political Science. Retrieved from: [https://www3.weforum.org/docs/WEF\\_PHSSR\\_Poland\\_Report.pdf](https://www3.weforum.org/docs/WEF_PHSSR_Poland_Report.pdf)
26. Krzysztoń, I., Walicka-Cupryś, K. (2016). Fizjoterapeuta jako zawód medyczny, jego kompetencje społeczne na tle innych zawodów medycznych. In: T. Pop (Ed.), *Rehabilitacja* (pp. 125-137). Rzeszów: Bonus Liber.
27. Kubicka-Daab, J. (2002). Budowa modeli kompetencji. In: A. Ludwicyński (Ed.). *Najlepsze praktyki zarządzania kapitałem ludzkim* (pp. 239-248). Warszawa: Polska Fundacja Promocji Kadr.
28. Kwiatkowski, S.M., Sepkowska, Z. (2000). *Budowa standardów kwalifikacji zawodowych w Polsce*. Warszawa/Radom: IBE-ITeE.
29. Leggat, S.G., Liang, Z., Howard, P.F. (2020). Differentiating between average and high-performing public healthcare managers: implications for public sector talent management. *Australian Health Review*, Vol. 44, No. 3, doi: 10.1071/AH19087
30. Lula, P., Oczkowska, R., Wiśniewska, S. (2018). Identyfikacja oczekiwań pracodawców dotyczących kompetencji zatrudnianych pracowników na podstawie eksploracyjnej analizy ofert pracy. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, Iss. 507, pp. 133-141, doi: 10.15611/pn.2018.507.13
31. Matczak, A. (2007). *Kwestionariusz Kompetencji Społecznych KKS, Podręcznik*. Warszawa: Pracownia Testów Psychologicznych, pp. 5-14.

32. Mikuła, B. (2001). *W kierunku organizacji inteligentnych*. Kraków: Antykwa, p. 50.
33. Mikuła, B., Pietruszka-Ortyl, A. (2007). Kompetencje pracowników w perspektywie strategicznego zarządzania wiedzą w przedsiębiorstwie. *Zeszyty Naukowe Akademii Ekonomicznej w Krakowie, No. 747*, pp. 49-73.
34. Miłaszewicz, D. (2015). Kompetencje społeczne polskich i litewskich studentów – analiza porównawcza. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, No. 401*, pp. 296-305, doi: 10.15611/pn.2015.401.27
35. Ministerstwo Funduszy i Polityki Regionalnej (2022). *Krajowy Plan Odbudowy i Zwiększania Odporności*. Warszawa. Retrieved from: <https://www.funduszeuropejskie.gov.pl/media/109762/KPO.pdf>, 05.05.2024.
36. Mitosis, K.D., Lamnisos, D., Talias, M.A. (2021). Talent Management in Healthcare: A Systematic Qualitative Review. *Sustainability, Vol. 13, No. 8*, doi: 10.3390/su13084469
37. Mondal, S., Saha, S., Mondal, H., De, R., Majumder, R., Saha, K. (2022). How to Conduct Inferential Statistics Online: A Brief Hands-On Guide for Biomedical Researchers. *Indian Journal of Vascular and Endovascular Surgery, Vol. 9, No. 1*, pp. 54-62, doi: 10.4103/ijves.ijves\_116\_21
38. Mroczek, B., Kotwas, A., Karpeta-Pawlak, I.E., Wolińska, W., Rudnicki, J., Bitkowska, M., Kurpas, D. (2017), Relationships Between the Level of Social Competence and Work-Related Behaviors in a Group of Physicians, Nurses, and Paramedics. *International Journal of Psychotherapy Practice and Research. Vol. 1, No. 1*, pp. 15-29, doi: 10.14302/issn.2574-612X.ijpr-17-1634
39. Orlińska-Gondor, A. (2006). Zarządzanie ludźmi oparte na pojęciu kompetencji. In: L. Zbiegień-Maciąg (Ed.), *Nowe tendencje i wyzwania w zarządzaniu personelem* (pp. 168-191). Kraków: Wolters Kluwer Polska.
40. Piszczycłowa, B. (2017). Kompetencje personelu medycznego wobec wyzwań współczesnego miejsca pracy na przykładzie podmiotów leczniczych. *Zeszyty Naukowe Wyższej Szkoły Bankowej w Poznaniu, Vol. 74, Iss. 3*, pp. 37-52. Retrieved from: <https://journals.wsb.poznan.pl/index.php/znwsb/issue/view/98/133>, 10.05.2024.
41. Pochtowski, A. (2003). *Zarządzanie zasobami ludzkimi. Strategie – procesy – metody*. Warszawa: PWE.
42. Pomaranik, W. (2022). Zarządzanie zasobami ludzkimi w polskich szpitalach. In: A. Stępiak-Kucharska, M. Kapela (Eds.), *Współczesne problemy gospodarcze – Zrównoważony rozwój*. Płock: Kolegium Nauk Ekonomicznych i Społecznych, Politechnika Warszawska.
43. Prusaczyk, A., Zuk, P., Guzek, M., Oberska, J., Bogdan, M. (2020). Istota kompetencji personelu medycznego wpływających na efektywność opieki nad pacjentem. *Zdrowie Publiczne i Zarządzanie. Vol. 18, Iss. 3*, pp. 222-226. Doi: 10.4467/20842627OZ.20.023.14140



44. Richardson, J.T.E. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review*, Vol. 6, No. 2, pp. 135-147, doi: 10.1016/j.edurev.2010.12.001
45. Rongińska, T., Gaida, W.A. (2012). *Strategie radzenia sobie z obciążeniem psychicznym w pracy zawodowej*. Zielona Góra: Oficyna Wydawnicza Uniwersytetu Zielonogórskiego.
46. Rostkowski, T. (2004). *Nowoczesne metody zarządzania zasobami ludzkimi*. Warszawa: Difin, pp. 41-59.
47. Rozporządzenie Ministra Edukacji i Nauki z dnia 29 września 2023 r. zmieniające rozporządzenie w sprawie standardów kształcenia przygotowującego do wykonywania zawodu lekarza, lekarza dentysty, farmaceuty, pielęgniarki, położnej, diagnosty laboratoryjnego, fizjoterapeuty i ratownika medycznego (Dz.U. 2023, poz. 2152).
48. Różański, A. (2018). Kompetencje społeczne menedżerów – oczekiwania pracodawców w Polsce i USA w świetle opublikowanych ofert pracy. *Edukacja-Technika-Informatyka*, Vol. 9, Iss. 3, pp. 139-145., doi: 10.15584/eti.2018.3.19
49. Rutkowska, K. (2005). Uwarunkowania kompetencji społecznych pielęgniarek – wybrane problemy. *Nasz Głos, Pismo Okręgowej Izby Pielęgniarek i Położnych Lublin*, No. 5, pp. 12-15.
50. Rutkowska, K. (2012). Kompetencje społeczne – bufor wypalenia zawodowego pielęgniarek, *Medycyna Ogólna i Nauki o Zdrowiu*, Vol. 18, No. 4, pp. 319-323.
51. Sajkiewicz, A. (2002). *Jakość zasobów pracy*. Warszawa: Poltex.
52. Schuller, I., Demetriou, Y. (2018). Physical activity interventions promoting social competence at school: A systematic review. *Educational Research Review*, Vol. 25, pp. 39-55, doi: 0.1016/j.edurev.2018.09.001
53. Serafin, K. (2016). Kompetencje pracownicze determinantą kreacji wartości kapitału intelektualnego organizacji. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, No. 238, pp. 16-28.
54. Seweryn, B., Spodaryk, M. (2014). Education and assessment of social competences in paramedic studies – inspired by National Framework of Qualifications. *Państwo i Społeczeństwo*, Vol. 14, No. 1, pp. 48-57. Retrieved from: <https://repozytorium.uafm.edu.pl/server/api/core/bitstreams/5fce2a2e-1958-4602-bc14-4d0b6190eed0/content>, 6.06.2024.
55. Sidor-Rządowska, M. (2008). Zarządzanie kompetencjami – teoria i praktyka. *Zarządzanie Zmianami*, Vol. 9, No. 20, pp. 1-10.
56. Skrzypczak, J. (1998). Tak zwane kompetencje kluczowe, ich charakter i potrzeba kształtowania w toku edukacji ustawicznej. *Edukacja Ustawiczna Dorosłych*, No. 3, pp. 19-30.
57. Smarżewska, D. (2019). Znaczenie kompetencji społecznych w zawodzie pielęgniarki – wyniki badań własnych. *Academy of Management*, Vol. 3, Iss. 2, pp. 48-60. Retrieved from: <https://wiz.pb.edu.pl/akademia-zarzadzania/wp-content/uploads/sites/3/2023/09/1.4.-D.->

- Smarzewska-Znaczenie-kompetencji-spoecznych-w-zawodzie-pielegniarki-%E2%80%93-wyniki-badan-wlasnych.pdf, 15.06.2024.
58. Smółka, P. (2008a). Rola metod edukacyjnych w rozwoju kompetencji społecznych. In: M. Dąbrowski (Ed.), *Kompetencje społeczne: metody pomiaru i doskonalenia umiejętności interpersonalnych* (pp. 139-141). Kraków: Wolters Kluwer Polska.
  59. Smółka, P. (2008b). Uwarunkowania kompetencji społecznych. In: M. Dąbrowski (Ed.), *Kompetencje społeczne: metody pomiaru i doskonalenia umiejętności interpersonalnych* (pp. 39-46). Kraków: Wolters Kluwer Polska.
  60. Sokołowska, M. (1986). *Socjologia medyczna*. Warszawa: Państwowy Zakład Wydawnictw Lekarskich, pp. 92-93.
  61. Szczęsna, A., Rostkowski, T. (2004). Zarządzanie kompetencjami. In: T. Rostkowski (Ed.), *Nowoczesne metody zarządzania zasobami ludzkimi* (pp. 37-76). Warszawa: Difin.
  62. Szmit, D. (2018). Zarządzanie kompetencjami pracowniczymi w aspekcie rozwoju organizacji. *Zeszyty Naukowe Politechniki Częstochowskiej, No. 29*, pp. 17-29, doi: 10.17512/znpcz.2018.1.02
  63. Tychmanowicz, A., Kuśpit, M. (2012). Social competences of health service workers. Pilot study. *Progress in Health Sciences, Vol. 2, Iss. 1*, pp. 107-112.
  64. Walicka-Cupryś, K., Smolarz, I. (2017). Kompetencje społeczne fizjoterapeutów z regionu podkarpacia. *Rozprawy Naukowe Akademii Wychowania Fizycznego we Wrocławiu, Vol. 59*, pp. 39-49.
  65. Wądołowska, L. (2013). Zasady obliczania i interpretacji wyników. In: A. Gronowska-Senger (Ed.), *Przewodnik metodyczny badań sposobu żywienia* (pp. 38-67). Warszawa: Wydawnictwo Komitetu Nauki o Żywieniu Człowieka Polskiej Akademii Nauk.
  66. Whiddet, S., Hollyforde, S. (2003). *Modele kompetencyjne w zarządzaniu zasobami ludzkimi* (pp. 13). Kraków: Oficyna Ekonomiczna Grupa Wolters Kluwer.
  67. Zaborniak-Sobczak, M., Walicka-Cupryś, K., Ćwirlej-Sozańska, A. (2012). Kompetencje społeczne pracowników ochrony zdrowia na przykładzie fizjoterapeutów. *Postępy Rehabilitacji, No. 2*, pp. 5-12.
  68. Zarek, A., Wyszadko, A. (2018). Potencjalności aktywne jako kompetencje społeczne: profil psychologiczny studentów medycyny w koncepcji transkulturowej psychoterapii pozytywnej. *Pomeranian Journal of Life Sciences, Vol. 64, No. 1*, pp. 85-91, doi: 10.21164/pomjlifesci.383

## SUBSIDIES AND BUSINESS COMPETITIVENESS IN POLAND'S RENEWABLE ENERGY MARKET

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**Purpose:** The aim of this article is to present the role of subsidies as a factor of competitiveness for businesses in the renewable energy sources (RES) market.

**Design/methodology/approach:** First, a review of available subsidies in Poland for individual customers was conducted. Next, based on the survey, the sources of financing for the purchase of RES by households in Poland were determined. Furthermore, an evaluation of various factors encouraging energy transformation was carried out, and the role of subsidies for the purchase of RES as a factor influencing the decision to transform a household was defined.

**Findings:** Research showed that higher government subsidies are the most important factor encouraging individual customers to invest in RES. Most respondents financed their RES purchases with personal funds, while subsidies and grants were the second most common option. The range of subsidies for purchasing and installing RES infrastructure in Poland for individual customers is extensive. Companies offering support in the subsidy application process can boost their market appeal and contribute to the broader adoption of RES in Poland.

**Research limitations/implications:** It is important to note that the sample size of individuals with installed RES was relatively small. Additionally, the considerations were limited to individual customers and they were excluding enterprises which are also important recipients in the RES market. Therefore, future research can expand on these considerations by focusing on the analysis of subsidies for enterprises to better understand how they influence firms' investment decisions. They could also conduct efficiency analyses of various subsidy programs to identify those that yield the best results and are most cost-effective.

**Originality/value:** The paper explores the dual impact of RES subsidies on reducing costs for consumers and enhancing market attractiveness for companies. By analyzing consumer financing sources and preferences, the study highlights the critical role of financial incentives in promoting energy transformation and increasing the adoption of RES technologies.

**Keywords:** competitiveness, renewable energy sources, subsidies, energy transition.

**Category of the paper:** research paper.

## 1. Introduction

Electricity plays a crucial role in the modern world, serving as an essential commodity for the functioning of nearly all aspects of daily and industrial life. It is the foundation for the operation of many devices, from simple household appliances to advanced technological systems. Although generated from a variety of sources, there is a shift from traditional fossil fuels towards alternative energy sources in the context of striving for sustainable development.

Renewable energy sources (RES) currently constitute the main alternative to fossil fuels and are recognized as a cornerstone in the fight against climate change. Their implementation in national energy systems not only meets the guidelines of global agreements, such as UN conventions, the European Union's energy and climate policy, or national energy strategies, but also represents a rational action supported by economic considerations (Tomaszewski, Sekściński, 2020). Generating electricity from RES is now a promising option that helps reduce high dependence on imported energy carriers (Karakosta et al., 2013).

The continuous tightening of emission standards results from processes occurring in the global economy, as well as those related to climate and technology (Kielierz, 2018). Nevertheless, the Polish energy sector still largely relies on coal. However, the future of Poland's energy sector seems closely linked to the RES development, due to the high potential of RES associated with Poland's geographical location (Seroka, 2022). Leading companies in the Polish energy sector have already adopted strategies involving significant investments in RES (Kubiczek, Przedworska, 2024).

The shift towards a cleaner and more sustainable environment by increasing the share of RES in electricity generation is mainly driven by the involvement of households (Kubiczek et al., 2023). In Poland, the lack of sufficient household engagement stems, among other things, from insufficient ecological awareness and government policies that reinforce the historically coal-centric nature of the economy. As a result, despite the significant EU and state funds earmarked for RES subsidies, they remain underutilized.

The purchase and installation of RES is costly, and the lack of financing options is a significant barrier to the energy transition. To accelerate this process, the role of subsidies must be increased (Krawczyńska et al., 2024). From the perspective of businesses, price is one of the key factors of competitiveness, and assistance in obtaining subsidies can become an essential element of market competition. The subsidy system plays an important role in the energy transition in Poland (Cop, 2023). The purpose of this article is to present the role of subsidies as a factor of competitiveness for businesses in the RES market. To achieve this goal, the following research questions were posed: What subsidies are available for the purchase of RES in Poland for individual customers? What percentage of people have used subsidies for the purchase of RES among Poles undergoing energy transformation? How are subsidies for the purchase of RES perceived as a factor influencing the decision to transform a household?

The article includes a review of available subsidies in Poland for individual customers and presents the results of own research on the sources of financing for the purchase of RES by households in Poland. It compares the evaluation of various factors encouraging energy transformation and defines the role of subsidies for the purchase of RES as a factor influencing the decision to transform a household.

## **2. Subsidies as an instrument for increasing the competitiveness of enterprises**

Poland still heavily relies on coal as an energy source, and the energy transition process is still poorly advanced. Despite the decrease in coal's share in the energy mix to 63% in 2023, coal still dominates not only in the power sector but also in the entire economy. The high costs of a coal-based economy stem from the increasing dependence on imported fossil fuels and the rising prices of emission allowances. Poland also has the most expensive energy in the European Union, which affects the competitiveness of its industry. There is a need to accelerate the energy transition to reduce emissions and increase the country's energy independence (Michalik, Zieliński, 2024).

A greater amount of alternative energy carriers to coal can result in a decrease in wholesale energy prices, which will contribute to reducing the operating costs of enterprises, increasing their competitiveness, and lowering the cost of living for households. Alternative energy generation technologies, based on local resources, have a beneficial impact on the economies of individual countries. By utilizing resources available in a given region, they help maintain resilience to external shocks related to energy security. This way, countries can become independent from energy imports and minimize the risks associated with global changes in energy commodity prices (Mammadov et al., 2022).

Unfortunately, the cost of installing photovoltaic systems remains high. Profitability analyses of investments in RES for individual customers show that even with a 50% subsidy, the return on investment will occur only after 17 or more years (Seklecki et al., 2024). Although the purchase and installation of RES infrastructure are costly, research by Szara (2024) indicates that this market is highly competitive, leading to excessive marketing activities. Among the respondents, 78.5% received at least several offers for RES installations, while only 7% did not receive any offers. These activities aim to encourage investments in RES, promoting these energy sources among individual customers and supporting energy transformation from a macroeconomic perspective.

In Poland, the sale and installation of RES are handled by companies of various sizes, from small one-person businesses to the four largest energy producers in the country. The largest companies offer a comprehensive service that includes not only the sale of devices

(e.g., photovoltaic panels) but also the design, installation, configuration, and servicing of the entire system. Administrative support is also crucial: companies assist customers in handling formalities related to subsidies and grid connection applications. This means that the customer receives a full package of services, and the company manages all the aspects related to RES.

Research by Mazzucato and Semieniuk (2018) highlights the possibility of RES financing from both public (state banks, state-owned enterprises, other public corporations, and government agencies) and private sources (energy companies, private utility companies, industry, commercial banks, institutional investors, and charitable organizations). This is particularly important as it supports the process of energy transformation. Abolhosseini and Heshmati (2014) note that many countries use tax incentives as a fiscal measure to promote the deployment of RES. Certain types of investments, especially those crucial for national interest, such as offshore wind energy in Poland, have special support mechanisms aimed at new technologies (Graczyk et al., 2020). In Poland, support mechanisms for RES can be divided into four groups: (i) financial (guarantees, preferential loans, subsidies, thermomodernization bonus), (ii) market-based (green certificates system, RES auction system), (iii) taxation (VAT rebate, excise tax relief, thermomodernization rebate, investment rebate for farmers), and (iv) regulatory (system of guaranteed tariffs, subsidies to FIP market price, system of net metering, system of net billing, PPA agreements) (Mazurek-Czarnecka et al., 2022).

### **3. Importance and overview of subsidies in the RES sector in Poland**

Poland, as an EU member, has received substantial funds and support for RES projects, which could significantly accelerate the process of decarbonization and modernization of the energy sector (Kubiczek, Przedworska, 2024). Despite this, studies have shown that the transformation process in Poland is progressing much slower than in most EU countries (Krawczyńska et al., 2024).

For many businesses, combating climate change by increasing the efficiency of electricity use and investing in RES are measures aimed at enhancing their competitiveness (Kosior, 2024). Experts recommend that investments in RES projects should focus on funding direct users, such as households, small and medium-sized enterprises, and small-scale projects that contribute to the development of local communities (Oji et al., 2016).

Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej (NFOŚiGW, eng. The National Fund for Environmental Protection and Water Management) plays the most significant role in subsidizing the purchase and installation of RES infrastructure in Poland. Established in 1989 during Poland's political transformation, NFOŚiGW serves as the main financial institution supporting environmental protection and water management in the country. Another important institution allocating funds for RES subsidies is the Bank Gospodarstwa

Krajowego (BGK), the only state-owned bank in Poland, fully owned by the State Treasury, whose objectives include supporting governmental socio-economic programs and local self-government and regional development programs. The results of the review of available programs through which individual customers can benefit from subsidies are presented in Table 1.

**Table 1.**  
*Subsidies for RES under support programs in Poland*

| Program name<br>(funding institution)  | Details   |
|--|---|
| <b>Mój prąd</b><br>(NFOŚiGW)   | <p>All expenses related to the purchase and installation of the PV micro-installation and additional equipment, as well as the connection of the PV micro-installation to the grid and the commissioning of additional equipment are eligible.</p> <p>The amount of subsidy (up to 50% of eligible costs no more than):</p> <ol style="list-style-type: none"> <li>1. photovoltaic micro-installation: PLN 6000 (only group 1 and 2 Applicants);</li> <li>2. photovoltaic micro-installation + additional device: PLN 7000 or PLN ,000 depending on the group of beneficiaries;</li> <li>3. additional equipment: <ul style="list-style-type: none"> <li>- Heat storage: PLN 5000;</li> <li>- Ground heat pumps - ground/water, water/water heat pumps: PLN 28,500;</li> <li>- Air/water heat pump with improved energy efficiency class: PLN 19,400;</li> <li>- Air/water heat pump: PLN 12,600;</li> <li>- Air/air heat pumps: PLN 4400;</li> <li>- Electricity storage: PLN 16,000;</li> <li>- HEMS/EMS energy management system: PLN 3000;</li> <li>- Solar hot water collectors: PLN 3500.</li> </ul> </li> </ol>  |
| <b>Moje ciepło</b><br>(NFOŚiGW from the Modernization Fund)                    | <p>Supporting the purchase and installation of heat pumps for new single-family buildings will contribute to reducing low emissions resulting from heating single-family homes with inefficient fossil fuel heat sources, in addition to increasing the share of RES in final energy consumption and promoting RES.</p> <ul style="list-style-type: none"> <li>- Ground source pumps: Percentage of eligible costs: Up to 30%. Percentage share of eligible costs for individuals with a Large Family Card<sup>1</sup>: Up to 45%. Maximum subsidy amount: PLN 21,000.</li> <li>- Air pumps (air-to-air type in a central system): Percentage of eligible costs: up to 30%. Percentage share of eligible costs for individuals with a Large Family Card: up to 45%. Maximum amount of subsidy: PLN 7000.</li> <li>- Air pumps (air-to-water type): Percentage share of eligible costs: up to 30%. Percentage share of eligible costs for individuals with a Large Family Card: Up to 45%. Maximum subsidy amount: PLN 7000.</li> </ul>  |
| <b>Ciepłe mieszkanie</b><br>(NFOŚiGW through the participating municipalities) | <p>The purpose of the program is to improve air quality and reduce particulate matter and greenhouse gas emissions by replacing heat sources and improving energy efficiency in units located in multi-family residential buildings.</p> <p>For final beneficiaries eligible for the basic level of subsidy (i.e., with an annual income not exceeding PLN 135,000): - up to 30% of the actually incurred eligible costs of the end-beneficiary's project, not more than PLN 16,500 per dwelling.</p> <p>For final beneficiaries eligible for an increased level of subsidy: - up to 60% of the actually incurred eligible costs of the project implemented by the final beneficiary, not more than PLN 27,500 per dwelling unit. For final beneficiaries eligible for the highest level of subsidy: - up to 90% of the actually incurred eligible costs of the project implemented by the final beneficiary, not more than PLN 41,000 per dwelling unit. An additional 5% for a unit in a multi-family building located in a locality on the list of the most polluted municipalities, up to PLN 19,000, PLN 29,500, and PLN 43,900, respectively. In turn, communities up to 60% of the actually incurred eligible costs of the project implemented by the final beneficiary, not more than from PLN 150,000 to PLN 375,000, depending on the scope of the project implemented.</p> |

Cont. table 1.

|  |  |
|--|--|
| <p><b>Stop smog</b><br/>(NFOŚiGW through the participating municipalities)</p> | <p>The “Stop Smog” program deals with low-emission measures implemented by municipalities in areas where so-called “anti-smog” resolutions are in force. Under this program, municipalities, inter-municipal associations, counties and a metropolitan association in the Silesian province can apply for subsidies for the elimination or replacement of heat sources with low-emission ones, as well as thermal modernization in single-family residential buildings of the least affluent. The ultimate beneficiaries of the program are those who cannot afford to replace their stove and insulate their homes. The program specifies that the beneficiaries in this case are those whose average monthly income per household member does not exceed 175% of the amount of the lowest pension in a single-person household and 125% of this amount in a multi-person household. Funding of up to 100% of the cost of the project. The average cost in a single building/location cannot exceed PLN 53,000.</p>   |
| <p><b>Ulga termomodernizacyjna</b><br/>(state budget)</p>                      | <p>The tax credit can be used if incurs expenses for thermal modernization of a single-family house. Whereby thermal modernization consists of: an improvement where the demand for energy supplied for heating and heating of domestic water and heating to residential buildings is reduced; an improvement where primary energy losses in local district heating networks and the local heat sources supplying them are reduced, if the residential buildings to which energy is supplied from these networks meet the energy-saving requirements of the Construction Law, or measures have been taken to reduce the consumption of energy supplied to these buildings; making a technical connection to a centralized heat source, in connection with the elimination of a local heat source, resulting in a reduction in the cost of obtaining heat supplied to residential buildings; total or partial conversion of energy sources to renewable sources or the use of high-efficiency cogeneration. The maximum amount of the deduction is PLN 53,000 to be claimed within 6 years counting from the end of the tax year in which the first expense was incurred.</p>   |
| <p><b>Premia termomodernizacyjna</b><br/>(Bank Gospodarstwa Krajowego)</p>     | <p>The thermomodernization bonus is available to the investor for the implementation of the thermomodernization project and constitutes repayment of the loan taken by the investor. It is intended for investors using a loan (support does not apply to investors implementing a thermomodernization project exclusively with their own funds). The amount of the loan is at least 50% of the cost of the thermomodernization project and is no less than the amount of the premium. The amount of the thermomodernization bonus is:</p> <ul style="list-style-type: none"> <li>- 26 percent of the cost of the thermomodernization project;</li> <li>- 31 percent of the total cost of the thermo-modernization project together with a RES project involving the purchase, installation, construction or modernization of a renewable energy source installation (the cost of the RES installation must constitute at least 10 percent of the total cost of thermo-modernization and RES installation);</li> <li>- additional support in the amount of 50% of the cost of strengthening a large-panel building - for the implementation of thermal modernization of buildings from the so-called “large-panel” with their strengthening.</li> </ul> <p>Thermomodernization grant is 10% of the net investment cost and increases support for deep and comprehensive thermomodernization of a multifamily building.</p> |

Note 1. Large Family Card (pol. Karta Dużej Rodziny) – A system of discounts and additional entitlements for families of 3+. Note 2. The review was carried out from July 1st to July 20th, 2024.

Source: own study based on data from government websites and particular programmes.

The review shows that individual customers in Poland have numerous opportunities to obtain funding for the purchase and installation of RES infrastructure. The state creates incentives for energy transformation. However, the number of these opportunities and programs can confuse consumers due to the diversity of requirements and application procedures. Including assistance in applying for subsidies by businesses can thus be a valuable addition to



their offerings, making it easier for consumers to access funds and simultaneously accelerating the energy transformation process.

#### **4. Methodology of primary research**

The evaluation of the role of subsidies as a factor in the competitiveness of businesses in the RES market in Poland was conducted from the consumers' perspective. Adopting this standpoint allowed for a better specification of consumer expectations and behaviors. This provides essential information enabling the determination of the dimensions of value created by businesses in practical terms.

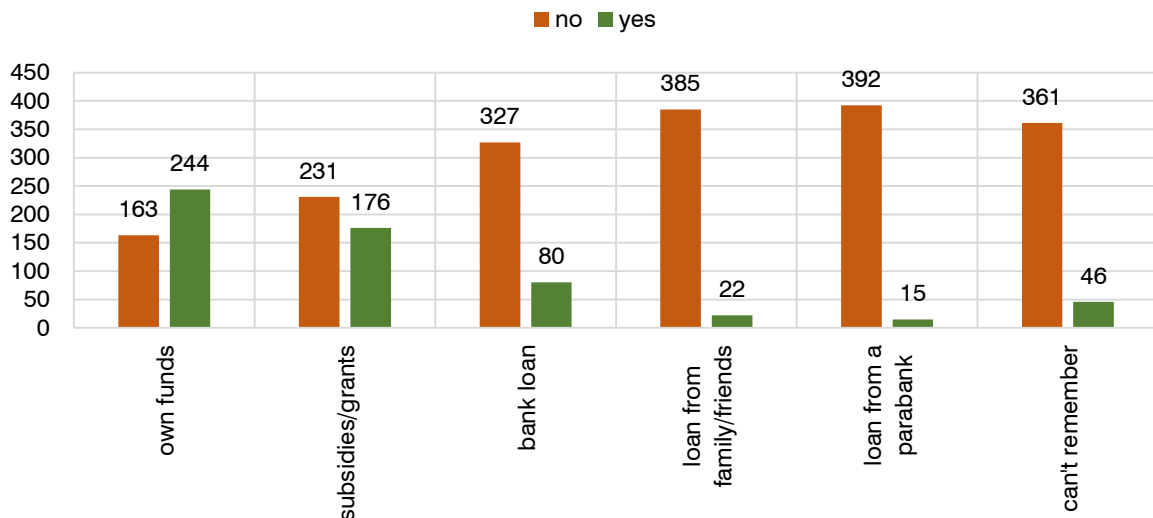
The data used in the analyses were collected through primary research on the determinants of energy transformation, conducted by the CAWI technique on using Ogólnopolski Panel Ariadna in December 2023, using a questionnaire as the research tool. The study involved 1781 respondents selected by quota sampling – their characteristics reflected the socio-demographic profile of adult Poles in terms of gender, age, education, and place of residence. After verifying the responses based on control questions, 1642 responses were deemed suitable for analysis. The respondents were divided into two groups. The first group consisted of those who had installed devices enabling the use of RES, while the second group did not have such devices. The group sizes were 407 and 1235 people, respectively.

Respondents received a set of questions tailored to their group membership. From the perspective of this article, it is essential to analyze the responses to two issues. For the first group, which already had installed RES devices, the questions focused on identifying the sources of financing for the purchase of RES, allowing for the verification of the actual use of government subsidies. For the second group, which did not have such devices, the focus was on assessing the factors that could increase the willingness to purchase RES installations, with particular emphasis on the role of government subsidies.

Through the analysis of responses from the first group, it was determined to what extent government subsidies were used in financing RES installations. Conversely, the analysis of responses from the second group helped identify whether government subsidies could encourage the adoption of RES, thereby becoming a significant factor in choosing a particular offer.

## 5. Results

In the era of increasing ecological awareness and the need to reduce greenhouse gas emissions, more people are choosing to invest in renewable energy infrastructure. To better understand how these investments are financed, respondents who had purchased RES installations were asked about the sources of their financing. Figure 1 illustrates the financing sources used by the respondents when purchasing renewable energy infrastructure.

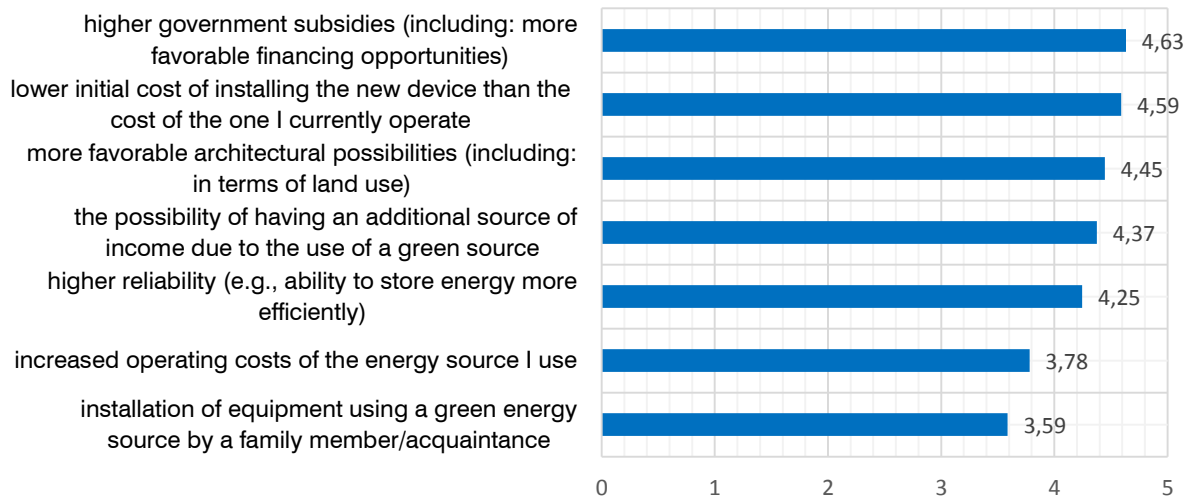


**Figure 1.** Use of specific funding sources when purchasing RES infrastructure.

Source: own study.

The vast majority of people used their own funds when purchasing RES infrastructure. The second most frequently indicated option was the use of subsidies and grants. Notably, 45% of respondents relied entirely on funding programs from local, government, or EU sources. Financing RES infrastructure through obligations such as bank loans or credits was much less common.

The next step was to compare the factors that could increase the willingness to purchase and install RES infrastructure among those who have not yet used this type of energy. The average ratings of these factors are presented in Figure 2.

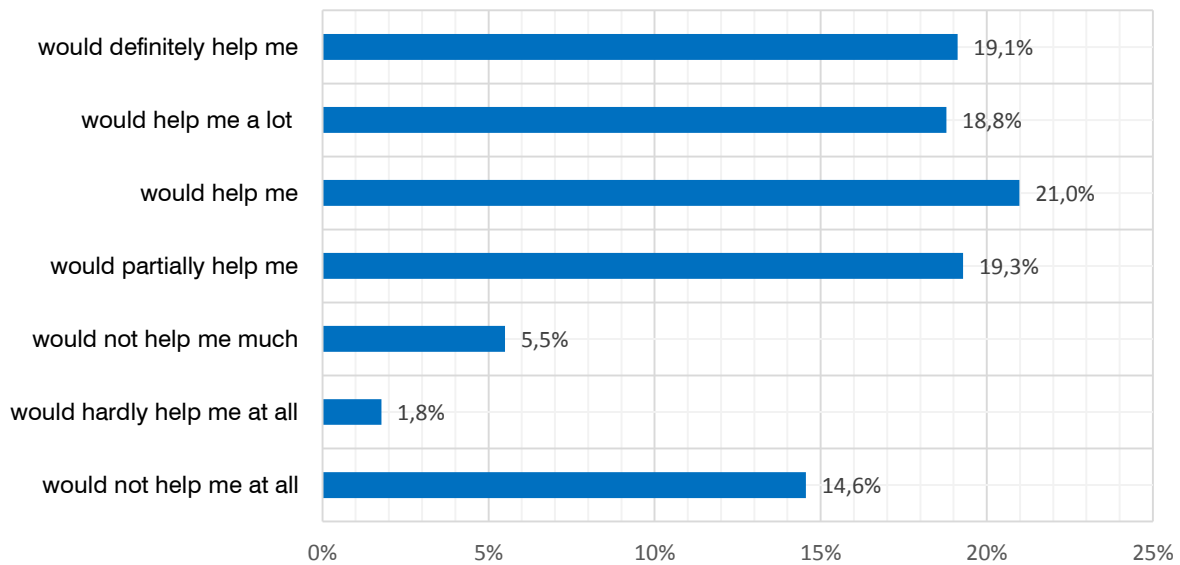


**Figure 2.** Average rating of individual factors encouraging transformation.

Source: own study.

The most important factor that would encourage respondents to undergo energy transformation is higher government subsidies. The amount and availability of these subsidies play a crucial role in the decision to invest in RES, as they can significantly reduce initial costs and increase the profitability of such ventures. This suggests that increasing the role of subsidies would likely positively impact the competitiveness of companies involved in the sale and installation of RES.

The second most important factor turned out to be the low initial cost of installation, which also reflects price as a fundamental determinant of consumer purchase decisions. The least significant factors were those related to the increase in the cost of the currently used energy source and the imitation effect, expressed as following the installation of devices by someone from the family or friends. Comparing the factors encouraging transformation suggests that higher subsidies are a significant factor. Therefore, the next step was to focus on and analyze the distribution of responses regarding the role of increased subsidies, as presented in Figure 3.



**Figure 3.** Higher subsidies as drivers of energy transition.

Source: own study.

Nearly 60% of respondents believe that higher subsidies would definitely help them decide to invest in RES. Another 20% think that higher subsidies would help only partially. Slightly over 20% of respondents feel that higher subsidies would have little to no impact on their decision. These respondents may be more skeptical about adopting RES.

These results indicate that for many respondents, assistance in obtaining subsidies from companies could be a crucial factor encouraging them to take advantage of their offerings and install RES. This means that companies offering support in the subsidy application process can increase their attractiveness in the market and simultaneously contribute to the broader implementation of RES.

## 6. Discussion

The increasing energy prices have intensified the importance of the energy transition, not only due to rising costs but also because of the continued dependence on fossil fuels. Mammadov et al. (2022) highlight that a significant use of RES in energy production can mitigate vulnerability to global shocks. In addition, Michalik and Zieliński (2024) stress that the urgency of enhancing Poland's energy independence—particularly in light of the war in Ukraine—should serve as a catalyst for accelerating the energy transition.

As Kubiczek et al. (2023) argue, the transformation of the energy sector at the household level forms the foundation for a broader national energy transition. Mazurek-Czarnecka et al. (2022) also emphasize that Poland offers a wide range of support instruments to facilitate this

shift. A comprehensive review of the available financial assistance for household energy transitions in Poland confirms the existence of diverse forms of funding.

Nevertheless, our research indicates that Poles primarily finance the purchase and installation of renewable energy infrastructure from their own savings, with fewer than half of the respondents utilizing local, governmental, or EU funding programs. This is a notable finding, given the high costs associated with acquiring and installing RES systems. The research further reveals that the availability of subsidies plays a critical role in promoting the energy transition, and increasing the amount of financial support could significantly boost this process. A large proportion of respondents indicated that higher subsidies would be a key motivator for them to undertake the energy transition, while also making it much easier to implement. This aligns with the postulates of Krawczyńska et al. (2024), who support the continued expansion of RES funding programs in Poland.

It is also important to note that respondents did not see the installations of RES by family or friends as a significant motivator for their own energy transitions. This suggests that the effect of social imitation is minimal in this context. This observation could provide a valuable direction for future research, particularly in examining the role of social factors in influencing investment decisions in renewable energy sources.

## 7. Conclusions

The range of available subsidies for the purchase and installation of RES infrastructure in Poland for individual customers is very broad. Individual customers can take advantage of many types of subsidies, which effectively reduce the costs they have to bear when deciding to use RES. However, the multitude of available options can cause difficulties in effective application, creating an opportunity for companies involved in the sale and installation of RES to include assistance in obtaining subsidies as part of their offerings.

The conducted research showed that the most important factor encouraging individual customers to invest in RES is higher government subsidies. Most respondents financed the purchase of RES infrastructure with their own funds, with subsidies and grants being the second most frequently indicated option. Bank loans or credits were used much less frequently. These findings underscore the crucial role of subsidies in increasing the competitiveness of companies in the RES market and in the process of energy transformation. Companies offering support in the subsidy application process can enhance their market attractiveness while contributing to the broader implementation of RES in Poland.

## **8. Practical implications**

The article holds significant practical value for both individual customers and companies operating in the renewable energy sector. It not only outlines the available forms of financial support but also highlights the crucial role that subsidies and grants play in the decision-making process for investing in RES. For businesses in the RES industry, the article serves as a valuable source of insight into customer needs and emphasizes the importance of offering comprehensive services, including assistance with securing subsidies. By doing so, companies can enhance their competitiveness and build a market advantage while also contributing to the broader implementation of RES in Poland. Therefore, the article provides practical guidance on how to better tailor offerings to customer expectations and how to more effectively support the energy transition process.

## **9. Limitations of the study and directions for further research**

Among the limitations of the study, it is important to note that the sample size of individuals with installed RES was relatively small. This is because the number of people who made such installations in Poland is not significant. Additionally, the considerations were limited to individual customers, excluding enterprises, which are also important recipients in the RES market.

Therefore, future research can expand on these considerations by focusing on the analysis of subsidies for enterprises to better understand how they influence firms' investment decisions. They could also conduct efficiency analyses of various subsidy programs to identify those that yield the best results and are most cost-effective. Consequently, such studies should also indicate which aspects of subsidy programs need modification to better meet the needs and expectations of potential beneficiaries.

Another important direction for future research could involve investigating whether the imitation effect significantly influences the adoption of RES technologies in the context of energy transformation. While the imitation effect—where individuals are influenced by the actions of others—has been observed in various sectors, the findings from our study suggest that this effect may not play a substantial role in the decision-making process of individual customers investing in RES. Therefore, it would be valuable to further explore whether social influence and peer behavior have a meaningful impact on RES adoption, or if other factors, such as financial incentives and personal environmental awareness, are more decisive.

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## References

1. Abolhosseini, S., Heshmati, A. (2014). The main support mechanisms to finance renewable energy development. *Renewable and Sustainable Energy Reviews*, 40, 876-885. <https://doi.org/10.1016/j.rser.2014.08.013>
2. Cop, K. (2023). Wyzwania sektora energii w kontekście transformacji energetycznej. *Studenckie Prace Prawnicze, Administratywistyczne i Ekonomiczne*, 43, 69-91. <https://doi.org/10.19195/1733-5779.43.7>
3. Graczyk, A.M., Graczyk, A., Żołyński, T. (2020). System for Financing Investments in Renewable Energy Sources in Poland. In: K. Daszyńska-Żygadło, A. Bem, B. Ryszawska, E. Jáki, T. Hajdíkóvá (Eds.), *Finance and Sustainability* (pp. 153-166). Springer International Publishing. [https://doi.org/10.1007/978-3-030-34401-6\\_13](https://doi.org/10.1007/978-3-030-34401-6_13)
4. Karakosta, C., Pappas, C., Marinakis, V., Psarras, J. (2013). Renewable energy and nuclear power towards sustainable development: Characteristics and prospects. *Renewable and Sustainable Energy Reviews*, 22, 187-197. <https://doi.org/10.1016/j.rser.2013.01.035>
5. Kielerz, A. (2018). Energetyka węglowa i OZE – wzajemne uzupełnienie czy rywalizacja? *Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi i Energią PAN*, 102, 217-229.
6. Kosior, K. (2024). Wsparcie konkurencyjności przedsiębiorstw przemysłu spożywczego w Polsce. Ocena roli środków inwestycyjnych Programu Rozwoju Obszarów Wiejskich na lata 2014-2020. *Studia BAS*, 77(1), 103-125. <https://doi.org/10.31268/StudiaBAS.2024.06>
7. Krawczyńska, D., Hadasik, B., Ryczko, A., Przedworska, K., Kubiczek, J. (2024). Pursuing European Green Deal milestones in times of war in Ukraine – a context of energy transition

- in Poland. *Economics and Environment*, 88(1), 736. <https://doi.org/10.34659/eis.2024.88.1.736>
8. Kubiczek, J., Hadasik, B., Krawczyńska, D., Przedworska, K., Ryczko, A. (2023). Going beyond frontiers in household energy transition in Poland—A perspective. *Frontiers in Energy Research*, 11, 1239115. <https://doi.org/10.3389/fenrg.2023.1239115>
  9. Kubiczek, J., Przedworska, K. (2024). Towards a green future: The Polish energy market and the potential of renewable energy sources. *Scientific Papers of Silesian University of Technology Organization and Management Series*, 2024(195), 345-356. <https://doi.org/10.29119/1641-3466.2024.195.21>
  10. Mammadov, N.S., Ganiyeva, N.A., Aliyeva, G.A. (2022). Role of Renewable Energy Sources in the World. *Journal of Renewable Energy, Electrical, and Computer Engineering*, 2(2), 63. <https://doi.org/10.29103/jreece.v2i2.8779>
  11. Mazurek-Czarnecka, A., Rosiek, K., Salamaga, M., Wąsowicz, K., Żaba-Nieroda, R. (2022). Study on Support Mechanisms for Renewable Energy Sources in Poland. *Energies*, 15(12), 4196. <https://doi.org/10.3390/en15124196>
  12. Mazzucato, M., Semieniuk, G. (2018). Financing renewable energy: Who is financing what and why it matters. *Technological Forecasting and Social Change*, 127, 8-22. <https://doi.org/10.1016/j.techfore.2017.05.021>
  13. Michalik, S., Zieliński, D. (2024). *Transformacja energetyczna w Polsce w świetle strategicznych dokumentów rządowych*. Sieć Badawcza Łukasiewicz – ITECH Instytut Innowacji i Technologii.
  14. Oji, C., Soumonni, O., Ojah, K. (2016). Financing Renewable Energy Projects for Sustainable Economic Development in Africa. *Energy Procedia*, 93, 113-119. <https://doi.org/10.1016/j.egypro.2016.07.158>
  15. Seklecki, K., Litzbarski, L., Wójcik, K., Cieślukowska, Z., Włas, M., Grochowski, J. (2024). Instalacje fotowoltaiczne w budownictwie wielorodzinnym. *Przegląd Elektrotechniczny*, 1(3), 81-83. <https://doi.org/10.15199/48.2024.03.13>
  16. Seroka, A. (2022). Odnawialne źródła energii jako element zarządzania bezpieczeństwem energetycznym państwa. *Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie*, 46(1), 88-100. <https://doi.org/10.17512/znpcz.2022.2.07>
  17. Szara, K. (2024). Behavioral Aspects of Investments in Renewable Energy Sources on the Example of Podkarpackie Province. *Economic and Regional Studies [Studia Ekonomiczne i Regionalne]*, 17(1), 164-180. <https://doi.org/10.2478/ers-2024-0009>
  18. Tomaszewski, K., Sekściński, A. (2020). Odnawialne źródła energii w Polsce – perspektywa lokalna i regionalna. *Rynek Energii*, 4, 10-19.



## KEY DETERMINANTS SHAPING THE EFFECTIVENESS OF DISTRIBUTION STRATEGIES IN THE POLISH COALMINES

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**Purpose:** The aim of this article was to identify the key determinants of the effectiveness of distribution strategies in coal mines in Poland. The study was conducted through in-depth interviews with representatives of Polish coal mines, preceded by a literature review.

**Findings:** (mandatory) The research identified several determinants influencing the effectiveness of distribution strategies in a declining market. These determinants include both internal factors, such as customization of the offer and managerial decision-making, and external factors, like geological conditions, legal environment, and information technologies. Offer customization was highlighted as essential for meeting the needs of both intermediaries and end-users, while effective decision-making and communication within the company were found to be crucial for maintaining strategic flexibility and profitability. Geological conditions and compliance with legal regulations were also deemed critical for maintaining a stable and continuous production process.

**Research limitations/implications:** The study is limited to the specific context of mining enterprises operating in a declining market, which may not be generalizable to other industries or markets. Future research should explore these determinants in different sectors and contexts, and further investigate the dynamic interactions between internal and external factors affecting distribution strategies.

**Practical implications:** The findings suggest that mining enterprises should adopt a holistic approach to formulating distribution strategies, taking into account all identified determinants. This includes focusing on product customization, enhancing managerial decision-making processes, and ensuring compliance with legal regulations. Companies should also leverage information technologies to optimize operational processes and improve customer satisfaction. Implementing these strategies can improve the overall efficiency of distribution strategies and enhance the competitive position of the enterprise in a declining market.

**Originality/value:** This paper provides a novel contribution by identifying and analyzing a comprehensive set of determinants influencing the effectiveness of distribution strategies in the context of a declining market, particularly within the mining industry. The value of the paper lies in its holistic approach to understanding the interplay of these factors and its practical implications for enhancing strategic decision-making. The findings are particularly valuable for managers and decision-makers in the mining sector, policymakers involved in regulatory frameworks, and researchers exploring strategic management in challenging eco.

**Keywords:** distribution strategies, mining industry, determinants of effectiveness.

**Category of the paper:** research paper, case study.

## 1. Introduction

Research on the fuel and energy sector is of significant importance for the stable functioning of states, as this sector plays a crucial role in the economy (Kamiński, 2007, p. 253), especially in a country like Poland, where coal mining ranks fourth among GDP-contributing industries. The issue of managing a business in a declining market, such as coal mining in Poland, presents a challenge, and the effectiveness of distribution strategies becomes critical in this context. Any disruptions in fuel and energy supplies or price instability can negatively impact the economy. Throughout the post-war period, mining in Poland has been one of the most important sectors of the socialist economy (Łukaszczyk, 2017). Today, due to historical conditions, the special treatment of this industry stemming from tradition, and pro-environmental actions, it faces numerous challenges. In Polish scientific literature hard coal is treated holistically (Przedworska, 2023) Researchers not dividing it into heating and coking coal (GUS, 2023). Due to economic transformations, as well as the pursuit of sustainable development and the reduction of fossil fuel consumption, the coal market is a declining market (Krzywda-Starzyk, 2021; Przedworska, 2021; Starzycka et al., 2020).

Recently, this sector has also been further impacted by the consequences of the Covid-19 pandemic and the war in Ukraine. The war in Ukraine and the embargo on Russian coal, first at the national level and eventually at the European level, caused significant disruptions in the domestic coal market. In 2021, Russia was the largest coal exporter to the European Union, with 75% of Poland's coal imports coming from Russia. Experts believe that Poland is "relatively safe due to domestic mining and available resources that allow for nearly full coverage of annual coal demand", but the absence of Russian coal in the domestic market "is a significant challenge from the perspective of energy security and economic stability in Poland" (Bukowski, Kobyłka, 2022). To meet demand and stabilize the market, the government, which holds majority stakes in most Polish mining enterprises, decided to intervene in the existing coal sales model.

Distribution is an essential marketing tool within an enterprise. Alongside product, price, and promotion, it constitutes a fundamental element of the classical set of tools that orient the enterprise towards the market and the customer (Mehmedov, 2023). Distribution is a mandatory component of the marketing mix, characterized by relatively low flexibility (susceptibility to change over time), with effects that are deferred (Wrzosek, 2005). An enterprise can achieve a competitive advantage through distribution elements (Paraschiv et al., 2020) such as an extensive sales network, product availability for buyers, fast and low-cost delivery, reduced capital freezing costs (Campos et al., 2023) or transportation costs, the use of multiple distribution channels, or the development of unique logistics practices and capabilities (Jelonek, 2004; Mellat-Parast, Spillan, 2014).

Effective distribution strategies play a crucial role in maintaining or increasing market share, expanding into new markets, reducing costs, and improving overall business performance (Campos et al., 2023; Odera, 2013). The selection, application, and management of distribution channel strategies are essential for effectively meeting customer needs (Mehmedov, 2023) while mitigating conflicts that may arise within distribution channels (Uche et al., 2022). Moreover, optimizing distribution processes can lead to a competitive advantage and improved business performance (Tuli, Fronda, 2023).

This study aims to identify the determinants of distribution efficiency in enterprises engaged in coal mining in Poland. Since, as stated, distribution is critically important to marketing, particularly in the context of coal mining enterprises, this study formulated the following research questions:

RQ1: What factors arising from the construction of distribution strategies impact the effectiveness of distribution strategies in coal mining enterprises?

RQ2: What factors arising from the interaction of other marketing tools affect the effectiveness of distribution strategies in coal mining enterprises?

The structure of the paper is presented as follows: in the literature review section discussed the significance of distribution as a component of the marketing mix for coal mining enterprises. Due to the specific nature of the coal industry, and political regulations, the review focuses on Polish literature. Section 3 presents the methodology of the study conducted by the authors among the coal enterprises in Poland, section 4 provides the results of the study, section 5 is a discussion on the results obtained by the authors.

## 2. Literature Review

The effectiveness of distribution depends on its interaction with other marketing instruments. A key factor influencing distribution efficiency and determining other distribution tools is product availability. It can impact the revenue and profit of both the seller and the buyer (Coyle et al., 2012) and has a positive and significant effect on customer satisfaction (Widianti, Sabar, 2019). At the same time, availability determines the size and location of inventories, affecting the total logistical cost of distribution (Li, J. et al., 2010), as it is crucial to maintain stock levels appropriately. This, in turn, is tied to storage costs, which are included in the final price of the product. Therefore, decisions regarding coal resources are strategic (Turek, Michalak, 2016), and altering their structure is virtually impossible. The specific characteristics of these resources and their defined parameters make recombination impossible. Thus, the seller's role is primarily to minimize the total logistical cost of distribution, including the cost of transporting the product from the warehouse to the retailer and the cost of maintaining stock at the retailers (Flores et al., 2023; Schweitzer et al., 2024).

Product availability is also closely linked to pricing policy. Swami & Khairnara (2006) indicate that in situations characterized by shortages or limited product availability, companies maximize profits by gradually increasing product prices as they approach the limit of available supply. The lower the availability, the higher the price becomes, which in turn reduces customer satisfaction related to price perception. Since coal extraction is associated with improving the living conditions of retail consumers (Li, Q. et al., 2018), high prices increase the risk of energy poverty (Mgwambani et al., 2018).

The price of coal is also dependent on its quality. The higher the quality, the higher the price of commercial coal (Widianti, Sabar, 2019), with calorific value being the primary factor influencing prices on international markets. Lorenz & Grudziński (2003) did not confirm any correlation between coal prices and the ash and sulfur content in the product. In contrast, the research by Widianti & Sabar (2019) demonstrated a strong relationship between price and quality, showing that price perception has a positive and significant impact on customer satisfaction. To achieve a high level of satisfaction, coal companies should offer prices that correspond to the quality of the coal sold, in accordance with the terms of the contract. It was also noted that delivering coal that meets contractual quality improves customer satisfaction (Widianti, Sabara, 2019). Cebo emphasizes that the product must be tailored to market requirements to achieve optimal economic results (Cebo, 2017). Baic, Blaschke & Gaja (2019) indicated that 90% of extracted coal undergoes processing to enhance its quality and meet the expectations of end customers.

In addition to product quality, the profitability of a distribution channel is directly tied to the level of customer satisfaction (Stern et al., 2002). Moreover, customer satisfaction is closely linked to loyalty, which in turn increases profitability through repeat purchases and improved cash flows (Alsemgeest, Smit, 2013). Enhancing the effectiveness of the distribution channel is supported by monitoring its intermediaries. Monitoring is crucial because the decisions of one channel member affect the operations of others. An action taken by a retailer that influences sales volume will impact the manufacturer's sales, even if the manufacturer is not directly observing it (McGuire, Staelin, 2008).

Brand strategy will also influence efficiency, especially in the case of multi-channel sales. Differentiated branding and appropriate profit-sharing mechanisms help reduce competition and improve coordination between channels (Yan, 2011). However, no studies have been identified that directly link promotional activities in coal sales to customer satisfaction or purchasing decisions. Research on coal promotion has primarily focused on encouraging the use of clean coal technologies (Chen, Xu, 2010; Dubiński et al., 2005; Kumar, Kumar, 2018; Miller, 2017). Additionally, there are voices suggesting that promoting such technologies is a form of greenwashing (Wilkenfeld et al., 2007; Winston, 2009).

The choice of distribution strategy is crucial for ensuring timely and high-quality product deliveries to customers (Sylvia et al., 2021). This builds customer stability, a concept related to loyalty. Customer loyalty is defined as a strong commitment to repeatedly purchase

a company's products, despite competitive actions aimed at changing customer behavior. However, it is important to note that these repeated purchasing behaviors can be influenced not only by consumer preferences but also by high switching costs, inertia, or convenience (Biscaia et al., 2017). Poor strategic decisions can lead to organizational bankruptcy. Alhawamdeh & Alsmairat (2019) emphasize that strategic decisions cannot be separated from managers, and sales efficiency is influenced by employees at all levels. Turek & Michalak (2016) distinguish between various categories of human resources working in coal mines: management and supervisory staff, underground workers, and surface workers. The success of the organization will depend on employees with the right qualifications, experience, and organizational abilities.

Kozłowski & Wojtas (2017) argue that in modern and efficient mining facilities, planning and management decisions should be supported by advanced management methods utilizing IT systems, automation, and artificial intelligence. Bluszcz & Kijewska (2012) add that the implementation of IT systems in mining, related to post-sales services such as transportation, unloading, financial services, or scheduling convenient delivery times, is part of customer relationship management strategies that enhance customer satisfaction.

### 3. Methods

The study was qualitative and was conducted based on a partially structured in-depth interview scenario. The respondents were representatives of the management of Polish mining enterprises. The interviews were carried out between September and November 2022. The sample selection was purposeful, with the selection criterion being the possession of an active license for coal mining.

Interviews were conducted, and completed survey questionnaires were obtained from the all mining enterprises in Poland: Jastrzębska Spółka Węglowa S.A., Lubelski Węgiel Bogdanka, POLSKA GRUPA GÓRNICZA S.A. (PGG), Przedsiębiorstwo Górnicze "SILESIA" sp. z o.o., TAURON Wydobycie S.A., WĘGŁOKOKS KRAJ S.A., Zakład Górniczy EKO-PLUS Sp. z o. o., Zakład Górniczy SILTECH.

Among the mining enterprises surveyed, one had coking coal as its dominant product, but this company also extracted thermal coal (Jastrzębska Spółka Węglowa, 2022). In contrast, for other companies (PGG, TAURON), coking coal was extracted only in certain facilities (por. Ganderska-Wojtaczka, 2011). Companies operating in Poland face similar challenges related to geology and mining, economics, and infrastructure. Therefore, in the authors' opinion, the experience of a mining enterprise primarily engaged in the extraction of coking coal could have contributed to increased distribution efficiency in other surveyed companies. Therefore, it was decided to study all enterprises, regardless of the category of hard coal they extract.

The questionnaire consisted of 19 questions, most of which were accompanied by additional, follow-up questions to deepen the understanding of the topic. The substantive scope of the interview focused on five areas, which were: Characteristics of distribution strategies, Measurement of distribution efficiency within the enterprise, Other marketing mix tools and their impact on distribution efficiency, Product availability and Costs of physical distribution.

The interviews conducted were transcribed and then analysed according to the procedure outlined by Creswell (2013). During the coding stage, a combination of thematic codes (pre-determined, derived from the literature review, with data matched to them) and emergent codes (developed during the analysis of the collected material) was used.

#### 4. Determinants of Distribution Strategy Effectiveness

The analysis of the collected material allowed for the identification of a number of determinants that, according to the respondents, influence the effectiveness of distribution strategies. These are:

**Table 1.**

*Identified determinants and selected responses from respondents*

| Action   | Examples  |
|--|---|
| <b>CUSTOMIZATION OF THE OFFER</b>  |   |
| By offering products that meet the expectations of buyers, whether they are the next link in the distribution chain or the final coal consumers.   | PG8: We also produce such refined types of coal with special grain sizes, with special parameters. We can make... we tailor it to the customer's needs.<br>PG6: The product is always tailored to the customer, with some limitations, of course, because coal is still a natural product.<br>PG4: The implementation of technical solutions ensures that the product simply has the parameters expected by the end customer. Because that is the key to sales success.   |
| <b>PRODUCTION PLAN</b>   |   |
| Effective production management requires accurate sales forecasts, which allow for adjusting the quantity and quality of extracted coal to the current and future market needs. Such a production plan enables the minimization of surpluses and shortages, which is crucial for optimizing resources. | PG5: It is well-known that the production planning process is extended over time; from the moment a decision is made about a specific coal seam, it takes roughly up to two years. So, it's clear that market conditions cannot be accurately predicted for that time frame.<br>PG7: At the same time, preparing coal seams for extraction takes about two to three years. It's not as simple as turning a conveyor belt on or off.<br>PG3: So, it would be great if miners could adapt to the season or market conditions, but that's not how it works. The coalface that will start operating in September at X [name of the mining facility, edited by author] in a few days was decided upon several years ago. |

Cont. table 1.

| <b>OPERATIONAL STOCK</b>  |   |
|---|---|
| <p>Maintaining an appropriate level of operational inventory enables a company to meet its contractual obligations on time. This allows the company to gain a competitive advantage by ensuring continuity of supply for its customers, even in the face of unexpected disruptions.</p>   | <p>PG2: First and foremost, it's the quality of the product we sell and the guarantee we provide. But that guarantee comes from the fact that we produce a certain amount, and we have a specific number of buyers, no more. And the buyer knows that they are assured of getting the product from us.</p> <p>PG5: Everyone builds their stockpile based on their experiences, needs, and personal judgment, but the rhythm and assurance of deliveries are the most important aspects of the entire supply chain. The effectiveness of these deliveries is most often evaluated during negotiations with a given contractor.</p> <p>PG8: If there is no stockpile, there is no fluidity or regularity in shipments. This is crucial for maintaining contract schedules, not to mention spot deals, maintaining coal quality, and avoiding penalties, etc. (...) So, everything has to run like clockwork. And for it to run like clockwork, there must be a stockpile, a buffer to regulate the continuity of shipments.</p>   |
| <b>PRICE POLICY</b>   |   |
| <p>By skillfully shaping prices, a company can influence the demand for its products, allowing for better alignment with coal supply. Pricing policy takes into account the optimization of inventory levels, preventing the waste of resources.</p>  | <p>PG2: There's no buyer for coal at a certain price. So, we have to consider whether to lower the price a bit to sell it, and that's how it went.</p> <p>PG5: When there was an oversupply of coal, we ran promotional campaigns. If someone purchased a certain volume during a specific period, they could expect some bonuses.</p> <p>PG8: During tough times, we offered [trade credits], extending payment terms.</p>   |
| <b>THE IMPORTANCE OF RELATIONSHIPS</b>  |   |
| <p>Building and maintaining strong relationships with customers is crucial for the success of personal sales, especially in conditions of market oversupply. Good relationships can significantly enhance customer loyalty and willingness to purchase, which is invaluable in the coal industry when there is an excess supply of the product.</p> | <p>PG1: When coal was on the market at that price, the Russian coal was cheaper... but they often bought from me at a much higher price than the Russian coal. Because, you know, it's not just about the price, there are relationships involved, sometimes you share a drink [laughs]!</p> <p>PG3: We used to do it, but we stopped last year, mainly because of the pandemic – at least once a year, we had meetings with our representatives. At least once, sometimes twice a year. During these meetings, we presented our sales strategy. (...) And clearly, I'm a strong advocate of such actions, and they definitely help the strategy and boost sales.</p> <p>PG6: ...our direct marketing with the client, because I emphasize that we should go out, gather information from the market, get that feedback. Otherwise, we sit in the office, detached from reality, not really knowing what's happening on the market. From our perspective, from my perspective as someone involved in marketing, it is more important...</p> <p>PG8: Historical relationships, for sure, that's one thing. Secondly, the trust that exists on the market. In the coal industry today, there aren't any other instruments needed, at least not for now.</p> |
| <b>GEOLOGICAL CONDITIONS</b>  |   |
| <p>Possessing geological resources that are economically viable and have a low risk of hazards is essential for maintaining continuous and stable production. Such resources represent a strategic asset that can provide a competitive market advantage.</p>   | <p>PG4: Yes, we closed another mine, because we shut down X [name of the mine, edited by the author] due to the exhaustion of extraction fronts. As a result, in our case, we are naturally shrinking our production.</p> <p>PG7: And we have a clearly defined production level, with possible deviations either on the positive side due to better geological conditions, or on the negative side due to geological problems. It's not possible, like when we lost a million tons this year, there's no opportunity to make up for that.</p> <p>PG8: We are not a mine with four, five, or six active coal faces, where if one fails, nothing major happens. For example, every mine, whether PGG or Bogdanka, experiences face failures, but no one counts that in the deficit—these are massive amounts. For instance, Bogdanka now has a shearer jam and a collapse of the coal face. This means they won't have any extraction for 12 months. They will lose about 1.5 million tons of coal over the year, meaning 1.5 million tons of coal won't enter the market.</p>   |

Cont. table 1.

| <b>DECISIONS MAKING</b>   |   |
|---|---|
| <p>The success of a company largely depends on its managers' ability to make sound strategic decisions that enhance sales profitability. Managers must be able to analyze market conditions and respond swiftly to changes.</p>   | <p>PG3: It's the commercial division, with its experience and forecasting based on various analyses and predictions, that drives this process, but everything is ultimately approved by the management board.</p> <p>PG6: Management decisions are not made in isolation. We have numerous departments involved in various aspects of process analysis, including internal controls and safety offices monitoring what happens in the mines. My office, in addition to handling marketing, is also responsible for analyses, producing daily quantitative, qualitative, and value-based reports on sales to specific segments. The management board has full access to this information, enabling them to make informed decisions and implement changes in distribution channels as needed.</p> <p>PG8: In the past, we had meetings with the management board once a quarter. Now, I have meetings with them three times a week: discussing what we are doing with prices, who we are selling to, who we are not selling to, why this and not that—it's madness. (...) My direct boss is the president, who is also the owner, and the board itself, because otherwise, they would crush me [laughs] and probably cart me away. So, I coordinate with the board, and then the board communicates with KRZG, meaning the mine's operations, saying—produce this, this, and this based on sales.</p> |
| <b>EMPLOYEE QUALIFICATIONS AND MOTIVATION</b>   |   |
| <p>The operational efficiency of a company is directly linked to the qualifications, experience, and organizational abilities of employees at all levels. Their motivation, driven by the opportunity to earn higher wages, is also a key factor in success.</p>  | <p>PG1: We want to maintain a high level of service quality because these are good employees, and that loader operates around the clock, ma'am—Saturdays, Sundays. Besides loading and shipping goods, when coal keeps coming down the shaft, they have to transport it. This is a dedicated crew, they're not just sellers. It's not like in a regular company with shareholders.</p> <p>PG3: But the knowledge about coal, gained from the ground level, about its production and extraction, really helped us. They didn't just come in and believe... now I can also explain how coal is mined. I thought I was convincing. It's not like someone, with all due respect, just fresh out of some economics studies, suddenly comes and starts selling coal. In every field, with every product, I believe you need to have knowledge about the product. Not just the product itself, but also how it's produced.</p> <p>PG8: There are coal faces that are only 1.3 meters high, and miners have to crouch to enter. They don't want to go in—they're scared, so they get bonuses, around 1000 to 2000 PLN, just to enter. (...) And in mines like ours, similar ones have 3000 workers. We have 1400 and do the same amount of work. That's something. And we're not exhausted. This is the result of proper organization, foresight, planning—excellent planning.</p>                          |
| <b>INFORMATION TECHNOLOGIES</b>   |   |
| <p>The use of modern information technologies for managing mining resources can significantly streamline operational processes and improve customer satisfaction through more efficient and automated service systems. Distribution logistics are enhanced by supporting timely fulfilment of contracts and aligning sales volumes with loading capacities.</p> | <p>PG5: Well, certainly some IT technologies are being introduced, mostly for data exchange, such as information flows, typically related to quality. (...) Various IT programs are definitely being developed and implemented to help predict this quality, so there are certainly efforts focused on the quick exchange of information with customers. Also, for better forecasting, identifying the deposit, predicting coal quality, and configuring operations to achieve the best possible quality.</p> <p>PG4: Well, life forced us to introduce the helpline, and it's pushing us to implement a hybrid solution—not quite an open online store, but a formula for an online store that completes the process. That means reserving a purchase date via the helpline, but the actual purchase happens in the online store, where the process is finalized—payment and so on. (...) We're introducing various IT tools to minimize the need for direct customer service.</p> <p>PG8: But we have an electronic B2B system. The driver receives an entry PIN, a time slot, and a window for entry, including for rail deliveries as well. So we are definitely winning through logistics at this point. It's no longer about coal availability, quality, or price, but logistics.</p>   |



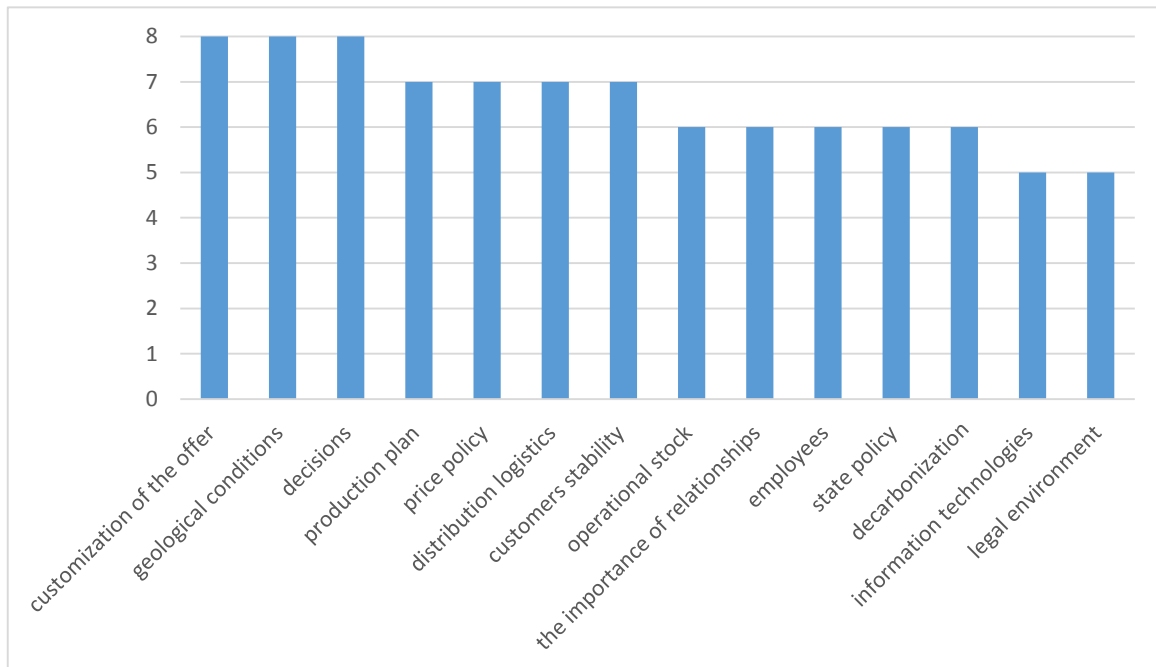
Cont. table 1.

| <b>DISTRIBUTION LOGISTICS</b>  |   |
|--|---|
| <p>Effective distribution logistics play a crucial role in ensuring timely deliveries and aligning sales volumes with loading capacities. A well-functioning logistics system minimizes delays and optimizes the use of transportation resources.</p>          | <p>PG5: Yes, we do have quite a bit of coal to transport, but the efficiency of the sidings is, shall we say, limited. If the railcars aren't brought in as they should be, then problems arise—queues, delays, and so on. The whole distribution chain breaks down.</p> <p>PG7: Our sales efficiency here depends on minimizing losses and ensuring a steady rotation of railcar loading and delivery to the customer. [...] This factor involves the potential for service, specifically the availability of railcars and their provision, as our sales rely on very large tonnages, i.e., volume. Thus, the ability to provide service is... cost efficiency for our customers is always the top priority, but also possessing the necessary competencies to handle specific routes.</p> <p>PG8: Additionally, trucks that arrive but are not loaded will incur penalties for us. They came to us, covered a certain distance, and completed the logistical approach, and then, what, they didn't receive any coal.</p>  |
| <b>CUSTOMERS STABILITY</b>   |   |
| <p>Customer stability, arising from predictable purchasing behaviours and readiness for irregular purchases, is a crucial element of distribution strategy effectiveness. Stable relationships with customers facilitate sales and production planning.</p>    | <p>PG4: However, with those clients and distributors, it was somewhat on their side; we could reschedule them from one day to the next week, or we would call them: "We need you to provide a few trucks today because we already have too much coal in the storage." And they would then send the trucks.</p> <p>PG5: Our strategy is based on long-term contracts. (...) So if they have a reliable source of supply and proven coal, they usually stick with it. Hence, these long-term relationships are, let's say, the core of this business. (...) It is a mutual interest. They want stable deliveries, and we want stable customers.</p> <p>PG7: This is both a concentration of volume and decision-making within a narrow group, which makes management much easier. Additionally, we know the partner on the other side. (...) We base our operations on long-term cooperation (...) because we rely on multi-year contracts. This gives us an understanding and knowledge of how our sales and production will be structured for several years ahead, thus placing more emphasis on managing customer relationships.</p> |
| <b>STATE POLICY</b>  |   |
| <p>Government interventions in market mechanisms can significantly impact a company's operations. State policies, regulations, and subsidies can directly or indirectly support or restrict a company's activities, influencing its distribution strategy.</p> | <p>PG8: A mine that operates according to a production plan often relies on state subsidies. The government injects significant amounts of money into such operations.</p> <p>PG6: Even though our authorized sellers continued to buy coal at 500-600 PLN per ton, they sold it for 1600-2000 PLN, which, for political reasons, was unacceptable. As a state-owned company, we had various requests [laughs] for intervention.</p> <p>PG8: We have to be very mindful of this because a mine operates under concessions. Even private mines are subject to state authorities. So if an official comes to us and something doesn't meet their standards, they can say, "I'm stopping this panel," and we might not be able to defend ourselves effectively.</p>  |
| <b>LEGAL ENVIRONMENT</b>   |   |
| <p>Legal regulations that can limit supply and demand for certain product groups significantly impact distribution strategy. Companies must adapt to existing regulations to avoid sanctions and maximize market benefits.</p>                                 | <p>PG2: Indeed, we must operate within the framework of geological and mining laws, as well as all related regulations, even though we are a relatively small operation. Similarly, in coal trading, we are required to adhere to existing norms and standards, and we cannot dictate the terms ourselves.</p> <p>PG8: We must take this into account because a mine operates under a system of licenses. Even a private mine is subject to state authorities.</p> <p>PG1: We don't want promotions because we can't mine more, as we're not allowed to. If it were a normal capitalist economy, I'd immediately start mining everywhere around, but it's not possible due to bureaucracy. It's not that they can't give permission, but they don't want to grant it—I don't understand this...</p>   |

Cont. table 1.

| <b>DECARBONIZATION</b>  |   |
|---|---|
| <p>The increased emphasis on decarbonization, which leads to reduced demand for coal and restrictions on its extraction, significantly affects the effectiveness of distribution strategies. Companies must adapt their strategies to the changing market and regulatory conditions related to the energy transition.</p> | <p>PG3: And building a long-term strategy in the coal market is, in my opinion, not feasible at the moment. I'm already abstracting from this year. But in the previous years... there is a European strategy—moving away from coal—and this has been happening in Poland over the last few years.</p> <p>PG4: Later, a social agreement came into effect due to the condition of the industry, which led to a notification to the EU about a law on reducing production capacities in the country. Now, this year [2022], it all sounds strange, but it still functions. This law concerning subsidies to mining enterprises is in place, and therefore, mining is still ongoing.</p> <p>PG8: Before the war, prices were very stable, coal was cheap, and importing it was not profitable, and so on. However, the concept of decarbonization and the trend towards phasing out coal and solid fuels have changed that.</p> |

The bar chart shows the number of companies mentioning specific determinants that impact the effectiveness of their distribution strategies.



**Figure 1.** Specific determinants mentioned by companies.

Key factors frequently highlighted include "decisions" and "customization of the offer", suggesting that strategic decision-making and tailoring services to customer needs are seen as highly influential. Very important are also "geological conditions". Conversely, factors such as "information technologies" and "legal environment" are mentioned less frequently, indicating they might be considered less critical or are already effectively managed. The broad range of determinants reflects the complex and multifaceted nature of distribution strategy efficiency in businesses.

These factors have been categorized into three groups, which are illustrated in Figure 2.

The first circle represents the production processes. These are factors over which the enterprise has direct control through its actions related to:

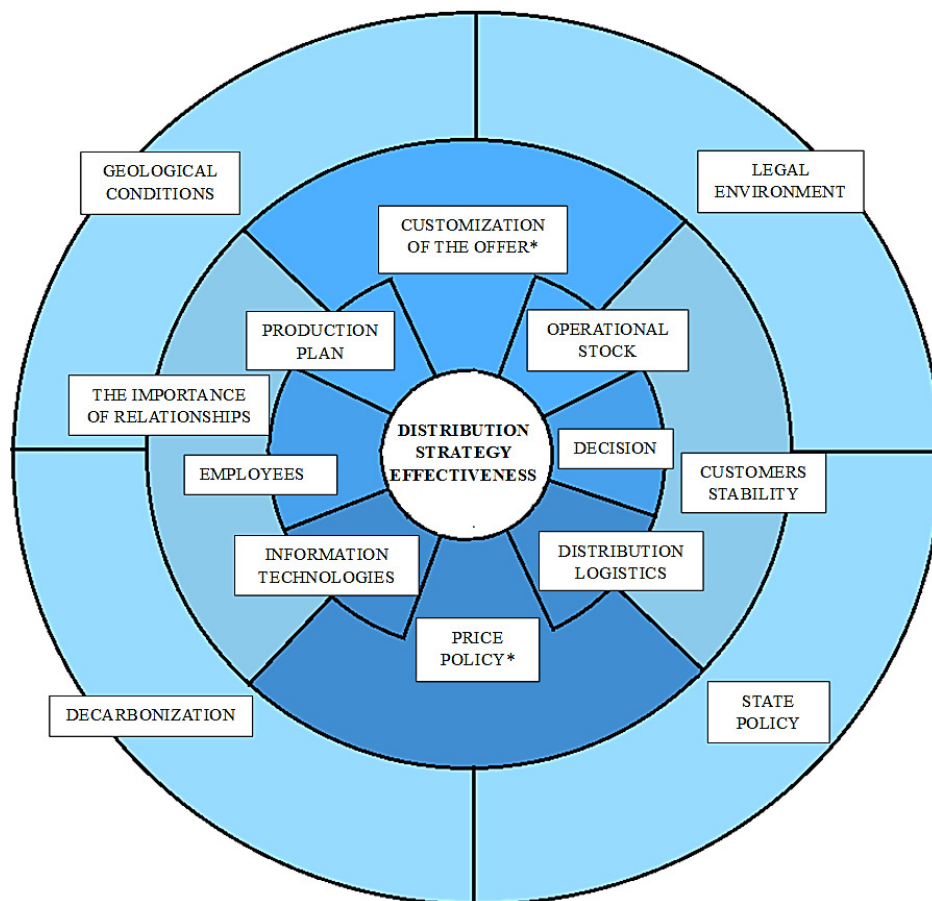
- Personnel management (employees at various levels and decision-making authority).
- Production management (production planning and adaptation, operational inventory).
- Sales management (utilized IT technologies, distribution logistics, and pricing policy).

The second circle represents the immediate environment of the company, related to:

- Product offering (product adaptation, pricing policy as a regulator of sales).
- Company customers (their stability/loyalty and relationships with them).

The third circle represents the broader environment of the enterprise, associated with:

- Geological conditions of mining operations.
- Legal environment and state policy.
- Decarbonization as a part of climate policy.



\* They were marked as a common part of the first and second circles due to the fact that both product fit and pricing policy are the result of the company's capabilities and market conditions, as the product and price are set by the company, but research has shown that they are strongly determined by the closer environment.

**Figure 2.** The Concept of Determinants of Distribution Strategy Efficiency in a Mining Enterprise [own].

Price policy and customization of the offer were highlighted as a common area between the first and second circles. This is because both product adaptation and pricing policy are the result of the enterprise's capabilities and market conditions. While the product and price are set by the enterprise, research has shown that they are strongly influenced by the immediate environment.

## 5. Discussion and conclusion

The conducted research revealed a number of determinants influencing the effectiveness of distribution strategies in a declining market. These include factors both dependent and independent of the enterprise. All of these factors impact the outcomes achieved by the enterprises or the costs associated with sales, thereby contributing to the overall efficiency of distribution strategies.

The most frequently cited determinants are Customization of the Offer, Decision Making, and Geological Conditions. Customization of the Offer, as mentioned in studies (Widianti, Sabar, 2019), involves providing products that meet the expectations of both intermediaries and end-users to enhance the quality of the final product. Respondents emphasized the necessity of producing a final product that aligns with customer needs, while being mindful of the limitations imposed by the natural characteristics of the raw material and the need for implementing technologies that ensure high-quality outcomes. The production of high-quality, personalized products, identified by study participants as crucial for sales success, is intrinsically linked to managerial decisions and the competencies of the management team (Turek, Michalak, 2016). The success of a company largely depends on its managers' ability to make strategic decisions that increase sales profitability. Managers must be capable of analyzing market conditions and responding swiftly to changes. Respondents noted that most decisions are based on data; however, the final decision is made by the management board. It is also emphasized that communication between the management board and the departments responsible for data collection and analysis is critically important for strategic decision-making. Nonetheless, there is a perception that despite the increased number of meetings, employees feel that decisions are made authoritatively. Additionally, Geological Conditions, or the possession of economically viable and safe geological resources, is crucial for production continuity and stability, serving as a strategic asset and competitive advantage, as highlighted by all respondents.

Among the least frequently cited determinants are Information Technologies, understood as the use of modern technologies (Bluszcz, Kijewska, 2012; Kozłowski, Wojtas, 2017) for managing mining resources, including logistics processes, streamlining operational processes, and improving customer satisfaction. According to respondents, the effectiveness of distribution strategy is also influenced by the Legal Environment, which encompasses the legal

framework of the enterprise and the activities of the state. This primarily concerns compliance with geological and mining law, as well as regulations that directly or indirectly affect the demand for the company's products and condition its supply. An example is the Regulation of the Minister of Energy of September 27, 2018, on quality requirements for solid fuels (Dz.U. 2018, poz. 1890), and its subsequent revocation by the Regulation of the Minister of Climate and Environment of August 25, 2022, concerning the waiver of the requirements set forth in the regulation on quality requirements for solid fuels (Dz.U. 2022, poz. 1786). The first document established the parameters for offered coal, prohibiting the trade of certain assortments and restricting the turnover of others, to which mining plants had to adapt. The second document temporarily opened the market, giving mining companies the opportunity to sell, for example, coal dust. Additionally, the Polish state, as the owner or co-owner of some mines, has a direct influence on decisions made there.

## 6. Summary

The conducted research identified the factors determining the effectiveness of distribution strategies for mining enterprises operating in a declining market (see Fig. 2). Analyzing these factors should serve as a basis for formulating an effective distribution strategy. The company should consider all three groups of factors, taking into account their potential impact on the selected groups. These factors should be examined holistically, without neglecting or overlooking any of the groups. Future research should explore these determinants in different sectors and contexts and further investigate the dynamic interactions between internal and external factors affecting distribution strategies. The findings are particularly valuable for managers and decision-makers in the mining sector, policymakers involved in regulatory frameworks, and researchers exploring strategic management in challenging economic environments.

## References

1. Alhawamdeh, H.M., Alsmairat, M.A. (2019). Strategic decision making and organization performance: A literature review. *International review of management and marketing*, 9(4), 95-99.
2. Alsemgeest, L., Smit, A. v A. (2013). The Contribution Of Business Units To Overall Company Customer Satisfaction And Profitability. *Journal of Applied Business Research (JABR)*, 29(4), Article 4. <https://doi.org/10.19030/jabr.v29i4.7918>

3. Baic, I., Blaschke, W., Gaj, B. (2019). Przeróbka węgla kamiennego w Polsce – stan obecny i trendy przyszłościowe. *Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi i Energią PAN, nr 108*.
4. Biscaia, A.R., Rosa, M.J., Moura e Sá, P., Sarrico, C.S. (2017). Assessing customer satisfaction and loyalty in the retail sector. *International Journal of Quality & Reliability Management, 34(9)*, 1508-1529. <https://doi.org/10.1108/IJQRM-03-2015-0039>
5. Bluszcz, A., Kijewska, A. (2012). Informatyczne wspomaganie zarządzania łańcuchem dostaw przedsiębiorstwa górniczego. In: *Problemy logistyczne, jakościowe i personalne w zarządzaniu przedsiębiorstwem* (pp. 61-81).
6. Bukowski, M., Kobyłka, K. (2022). *Nowy paradygmat. Dlaczego energetyka potrzebuje konkurencji?* Warszawa.
7. Campos, P.M., Pimentel, C.M.O., Lopes, J.D. (2023). Angolan Cement Industry: Marketing Channel and Distribution Channel Strategies. In: J.C. de Oliveira Matias, C.M. Oliveira Pimentel, J.C. Gonçalves dos Reis, J.M. Costa Martins das Dores, G. Santos (eds.), *Quality Innovation and Sustainability* (pp. 323-335). Springer International Publishing. [https://doi.org/10.1007/978-3-031-12914-8\\_25](https://doi.org/10.1007/978-3-031-12914-8_25)
8. Cebo, W. (2017). Aktualny stan oraz główne kierunki rozwoju przeróbki węgla kamiennego w Polskiej Grupie Górniczej sp. z o.o. *Inżynieria Mineralna, R. 18, nr 2*.
9. Chen, W., Xu, R. (2010). Clean coal technology development in China. *Energy Policy, 38(5)*, 2123-2130. <https://doi.org/10.1016/j.enpol.2009.06.003>
10. Coyle, J.J., Langley, C.J., Novack, R.A., Gibson, B. (2012). *Supply Chain Management: A Logistics Perspective*. Cengage Learning.
11. Creswell, J.W. (2013). *Projektowanie badań naukowych. Metody jakościowe, ilościowe i mieszane*. Wydawnictwo Uniwersytetu Jagiellońskiego.
12. Dubiński, J., Turek, M., Aleksa, H. (2005). Węgiel kamienny dla energetyki zawodowej w aspekcie wymogów ekologicznych. *Prace Naukowe GIG. Górnictwo i Środowisko. Główny Instytut Górnictwa, nr 2*, 5-21.
13. Flores, J.R., Cúnico, M.L., Vecchiotti, A. (2023). A disjunctive model to analyze and redefine the logistic of replenishing goods of retailing stores. *Optimization and Engineering, 24(2)*, 779-799. <https://doi.org/10.1007/s11081-021-09706-z>
14. Ganderska-Wojtaczka, K. (2011). *Baza zasobowa węgla koksowych kopalń wchodzących w skład Kompanii Węglowej SA*. XXV konferencja z cyklu Zagadnienia surowców energetycznych i energii w gospodarce krajowej. Zakopane.
15. GUS (2023). *Zużycie paliw i nośników energii w 2022 roku*. Główny Urząd Statystyczny. [https://stat.gov.pl/download/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/6/17/1/zuzycie\\_paliw\\_i\\_nosnikow\\_energii\\_w\\_2022.pdf](https://stat.gov.pl/download/gfx/portalinformacyjny/pl/defaultaktualnosci/5485/6/17/1/zuzycie_paliw_i_nosnikow_energii_w_2022.pdf)
16. Jelonek, D. (2004). Wybrane źródła konkurencyjnej przewagi przedsiębiorstwa w przestrzeni internetowej. *Studia i Materiały Polskiego Stowarzyszenia Zarządzania Wiedzą, 3*, 19-26.

17. Kamiński, J. (2007). Liberalizacja rynku energii elektrycznej a zużycie węgla w sektorze elektroenergetycznym—Ujęcie modelowe. *Polityka Energetyczna*, T. 10, spec. 2, 253-275.
18. Kozłowski, A., Wojtas, P. (2017). Systemowe podejście do cyfryzacji w procesach technologicznych w górnictwie. *Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi i Energią PAN*, nr 99. <http://yadda.icm.edu.pl/baztech/element/bwmeta1.element.baztech-2710f428-f0d8-4b3e-bb48-e16262246f2f>
19. Krzywda-Starzyk, P. (2021). Wałbrzych Meant Coal: The Closure of the Wałbrzych Mines in the Context of the Socio-Technical Carbon Lock-In. *Regional Journal [Biblioteka Regionalisty]*, 21, 62-77. <https://doi.org/10.15611/br.2021.1.06>
20. Kumar, D., Kumar, D. (2018). Chapter 1—Introduction. In: D. Kumar, D. Kumar (eds.), *Sustainable Management of Coal Preparation* (pp. 3-14). Woodhead Publishing. <https://doi.org/10.1016/B978-0-12-812632-5.00001-X>
21. Li, J., Chen, H., Chu, F. (2010). Performance evaluation of distribution strategies for the inventory routing problem. *European Journal of Operational Research*, 202(2), 412-419.
22. Li, Q., Stoeckl, N., King, D., Gyuris, E. (2018). Using Both Objective and Subjective Indicators to Investigate the Impacts of Coal Mining on Wellbeing of Host Communities: A Case-Study in Shanxi Province, China. *Social Indicators Research*, 137(3), 895-921. <https://doi.org/10.1007/s11205-017-1624-2>
23. Lorenz, U., Grudziński, Z. (2003). Hard coal for energetic purposes: Price–quality relationships; international coal market observations and Polish practice. *Applied Energy*, 74(3), 271-279.
24. Łukaszczyk, Z. (2017). Szkic o dziejach górnictwa węgla kamiennego na Górnym Śląsku. Zmieniamy górnictwo w sercu Śląska. In: *De profundis ad Te clamamus. Świat górników w radiowych i telewizyjnych homiliach biskupów katowickich na uroczystość św. Barbary (1983-2016). Edycja źródeł z komentarzem* (pp. 39-45). Księgarnia św. Jacka.
25. McGuire, T.W., Staelin, R. (2008). An Industry Equilibrium Analysis of Downstream Vertical Integration. *Marketing Science*, 27(1), 115-130. <https://doi.org/10.1287/mksc.1070.0335>
26. Mehmedov, M. (2023). Marketing and logistics – two sides of customer/consumer satisfaction. *E3S Web of Conferences*, 376, 04025. <https://doi.org/10.1051/e3sconf/202337604025>
27. Mellat-Parast, M.E., Spillan, J. (2014). Logistics and supply chain process integration as a source of competitive advantage: An empirical analysis. *The International Journal of Logistics Management*, 25(2), 289-314.
28. Mgwambani, S.L., Kasangana, K.K., Makonese, T., Masekamani, D., Gulumian, M., Mbonane, T.P. (2018). *Assessment of Household Energy Poverty levels in Louville, Mpumalanga, South Africa*. 2018 International conference on the domestic use of energy (DUE). International Conference on the Domestic Use of Energy (DUE). New York. <https://www.webofscience.com/wos/woscc/full-record/WOS:000455158500007>

29. Miller, B.G. (2017). 4—Introduction to Coal Utilization Technologies. In: B.G. Miller (ed.), *Clean Coal Engineering Technology (Second Edition)* (pp. 147-229). Butterworth-Heinemann. <https://doi.org/10.1016/B978-0-12-811365-3.00004-1>
30. Odera, O. (2013). Analysis of retail marketing strategies on organizational competitiveness. *International Journal Of Management & Information Technology*, 3(2), Article 2. <https://doi.org/10.24297/ijmit.v3i2.1366>
31. Paraschiv, C., Benmoyal-Bouzaglo, S., Boissinot, A. (2020). Vers un modèle intégré de perception de la livraison par les consommateurs: Une rencontre entre le marketing et la logistique. *Recherches en Sciences de Gestion*, 139(4), 109-136. <https://doi.org/10.3917/resg.139.0109>
32. Przedworska, K. (2021). Zarządzanie marketingowo-logistyczne w firmach pośredniczących w handlu węglem kamiennym. In: N. Iwaszczuk (ed.), *Decyzje menedżerskie w warunkach zmiennego otoczenia* (pp. 73-85). Wydawnictwo AGH.
33. Przedworska, K. (2023). *Efektywność strategii dystrybucji na rynku schyłkowym*. Uniwersytet Ekonomiczny w Katowicach. [https://bip.ue.katowice.pl/fileadmin/user\\_upload/jednostki/komitety-naukowe/doktoraty/przedworska/mgr\\_Kornelia\\_Przedworska\\_-\\_rozprawa\\_doktorska.pdf](https://bip.ue.katowice.pl/fileadmin/user_upload/jednostki/komitety-naukowe/doktoraty/przedworska/mgr_Kornelia_Przedworska_-_rozprawa_doktorska.pdf)
34. Schweitzer, N.L.S. de S., Arante, M.T., Agostino, Í.R.S., Braghirolli, L.F., Mafia, M.M.P., Frazzon, E.M. (2024). Ship-from-store omnichannel using a 4pl digital platform. *Brazilian Journal of Operations & Production Management*, 21(2), Article 2. <https://doi.org/10.14488/BJOPM.1856.2024>
35. Starzycka, A., Młynarczyk, M., Zdanowski, A. (2020). *Węgiel kamienny*. Państwowy Instytut Geologiczny.
36. Stern, L.W., El-Ansary, A.I., Coughlan, A.T. (2002). *Kanały marketingowe*. PWN.
37. Swami, S., Khairnar, P.J. (2006). Optimal normative policies for marketing of products with limited availability. *Annals of Operations Research*, 143(1), 107-121.
38. Sylvia, T., Sembiring, N.B., Ulfiyati, N. (2021). Distribution Strategies Analysis Using AHP and TOPSIS: A Distribution Company Case's Study in Special Region of Yogyakarta, Indonesia. *Journal of Science and Applicative Technology*, 5(2), Article 2. <https://doi.org/10.35472/jsat.v5i2.364>
39. Tuli, C., Fronda, J. (2023). Marketing Strategies of Retail Enterprises in Guangdong, China: Basis for Marketing Plan. *The Quest: Journal of Multidisciplinary Research and Development*, 2(3), Article 3. <https://doi.org/10.60008/thequest.v2i3.153>
40. Turek, M., Michalak, A. (2016). Metoda kompleksowego audytu kopalń węgla kamiennego w kontekście oceny ich perspektyw rozwojowych. *Zeszyty Naukowe. Organizacja i Zarządzanie*, z. 87. Politechnika Śląska, 415-428.
41. Uche, D.B., Anene, J.N., Nnabugwu, E.L. (2022). Effect of Distribution Channel Strategies on the Performance of Banks. *Daengku: Journal of Humanities and Social Sciences Innovation*, 2(2), 104-116. <https://doi.org/10.35877/454RI.daengku732>



42. Widianti, A., Sabar, M. (2019). The influences of product quality, service quality and price perception on coal customer satisfaction of PT Sriwijaya Bara Priharum. *International Journal of Innovative Science and Research Technology*, 4(12), 365-372.
43. Wilkenfeld, G., Hamilton, C., Saddler, H. (2007). *'Clean Coal' and Other Greenhouse Myths*. Australia Institute.
44. Winston, L.E. (2009). *Clean Coal Technology: Environmental Solution or Greenwashing?* Ohio University.
45. WiseEuropa (2024). *WiseEuropa*. <https://wise-europa.eu/>
46. Wrzosek, W. (ed.) (2005). *Efektywność marketingu*. PWE.
47. Yan, R. (2011). Managing channel coordination in a multi-channel manufacturer–retailer supply chain. *Industrial Marketing Management*, 40(4), 636-642.



## THE FACTORS OF TOURIST BUSINESSES' COMPETITIVENESS IN THE OPINIONS OF Z GENERATION

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**Purpose:** Identify the key factors of tourist businesses' competitiveness in the opinions of Z generation. A research hypothesis H1 is posited: digitalisation is an important factor of tourist businesses' competitiveness. The concept and nature of competitiveness and the sources of competitive advantage are discussed, with a special emphasis on tourist operators.

**Design/methodology/approach:** The theoretical section follows a thorough review of leading specialist literature. The empirical part uses exploratory factor analysis to identify main factors and explicate correlations among the variables analysed and verify the hypothesis. The number of factors is determined by means of Cattell's method and Kaiser's criterion.

**Findings:** The results of a survey conducted in June 2024 among generation Z individuals, that is, born in 1995-2012, are presented. 332 surveys were completed correctly. The exploratory factor analysis is employed to prove digitalisation is a major factor in tourist businesses' competitiveness.

**Practical implications:** The results can be taken advantage of by tourist managers as the selection of certain factors of competitiveness is suggested. Addressing the factors of paramount importance to the Z generation may become a source of competitive advantage to tourist businesses.

**Originality/value:** The results of a survey of 332 generation Z representatives are presented.

**Keywords:** competitiveness factors, tourist businesses, Z generation.

**Category of the paper:** research paper.

### 1. Introduction

The contemporary, unpredictable socio-economic environment forces businesses to make decisions that will assure lasting competitive advantage. Market rivals seek new solutions to satisfy customer needs and adapt to environment conditions by using its resources.

Knowing the preferences and habits of consumers representing various generations is vital information for businesses (including tour operators). This information allows for appropriate actions and applying specific instruments to improve competitiveness and competitive advantage in the market. Generation Z is assumed to comprise those born after 1995 (Jayatissa, 2023; Dolot, 2018; Ławińska, Korombel, 2023). These are young people at the start of their careers who are entering or about to enter the job market (often in odd jobs) and who shape the generation's expectations about their future (Piotrowska, 2022). They are known as digital natives who are proficient in using technology and social media, they also possess unique characteristics such as being entrepreneurial, socially conscious, pragmatic, and diverse (Jayatissa, 2023). Their driving features include (Oxford Economics, 2021): agility (rapid information acquisition and response to challenges), creativity (they can create and design digital content more often than other generations can), and curiosity (they are more often involved in various forms of informal learning).

This paper is intended to identify key competitiveness factor of tourist business from the viewpoint of Z generation.

The choice of competitiveness factors by tourist firms from the perspective of Z generation (born in 1995-2012) is crucial, since this generation has unique needs and expectations that differ from those of previous generations. This is the first truly digital generation, who grew up with technology and the Internet. Therefore, this article poses the hypothesis regarding the dependence between digitalisation and the competitiveness of tourist sector entities.

The goal is realised and the hypothesis verified by means of a literature review, a survey of 332 generation Z persons, and exploratory factor analysis.

## **2. Literature review**

The notion of competitiveness is closely associated with M. Porter's breakthrough book (*The Competitive Advantage of Nations*, 1990), a complex, relative, and multidimensional concept. The lack of clear definitions of competitiveness is rooted in the extensive scope of research. Competitiveness is treated as a qualitative measure of socio-economic development, a fundamental economic category that serves to describe the development of particular entities, economies, societies or geographical units (Maslova, 2020; Karman et al., 2022). Competitiveness is at every level a result of multiple internal and external factors of a social, political, natural, and cultural nature.

Competitiveness is among factors influencing companies' position and makes them structured to better compete in the market. A competitive company can market products and services efficiently and effectively, with appropriate prices and quality for customers. Therefore, the competitiveness at firm level can be perceived as a sustainable position of the

company to meet the forces of competition in a given business sector, in order to overcome its rivals in terms of longterm profitability (Dresh et al., 2018). Chickán (2022) points out competitiveness is a capability of a firm to sustainably fulfil its dual purpose: meeting customer demand for profit (through offering on the market goods and services which customers value higher than those offered by competitors) and adaptation to changing social and economic norms and conditions. Competitiveness is the capability of an individual organization to gain competitive advantages over its rivals (Vîrjan et al., 2023) and its sources can be found both in the external and internal environments of enterprises (Doncheva, 2020).

With reference to tourist enterprises, competitiveness is defined as the ability to reinforce and improve a firm's standing in the tourist market while preserving operating efficiency (Kowalska, 2018). Competitive advantage is defined as the ability to increase expenditure on tourism, find ways to attract visitors, provide memorable and satisfying experiences with a profitable business approach, improve the welfare of local communities, and, of course, maintain the natural capital qualities of destinations for the benefit of future generations. A destination's competitive advantage is also explicated as the destination's ability to maintain or improve its position in the market (Armullah et al., 2023).

Competitive advantage is based on the strengths of a company which its competitor does not have (Lestari et al., 2020). Specific, unique, valuable and hard to imitate or substitute resources and skills (called strategic assets and core competences) allow a firm for a long-term competitive advantage and finally for recurrent, above-average income. Competitive advantage can be described as the edge on the competitive market in relation to skills, services as well as technology (Kerdpitak et al., 2022). Competitive advantage is an enterprise's supreme standing in the market that lets it offer products/services at lower prices and better quality than competitive firms can. Three types of competitive advantage are distinguished: qualitative, pricing, and information (Grębowiec, 2021).

The pricing and quality of an enterprise's range are among the basic (classic) instruments of competing that determine continued competitive advantage. The operational perspectives of marketing capabilities (marketing mix, intellectual capital and competition) are some other factors enabling competitive advantage and improved business efficiency (Metha, Ali, 2020). Marketing theories specify the scope of actions and means to compete effectively and provide for customer satisfaction. The development of these theories and principles of quality management helps expand the list of instruments, including: the distinctiveness of products, flexible offer adaptable to changing purchasing preferences, easy access to products/services, the extent of enterprise's range, the promotion of undertaking and its products/services, the scope, pricing, and quality of auxiliary services, company image, terms of payment, creation of customer needs, etc. (Grębowiec, 2021). The list of competing instruments is not closed-ended due to the variety of consumer and enterprise behaviour, and the fluctuations of market environment.

Natural and anthropogenic (cultural) qualities are among the sources of competitive advantage for tourist entities and destinations. Cultural resources are an exceptional facility to attract tourists to a destination. These include: museums, castles, palaces, archaeological reserves, heritage parks, historical military facilities, pilgrimage destinations, and religious locations. Cultural tourism and sustainable tourism development have positive and significant influence on destination competitiveness. Ecotourism is directly having no significant influence on destination competitiveness but it is indirectly having a significant influence on competitiveness through sustainable tourism development (Wardana et al., 2019).

Corporate Social Responsibility, which assumes responsible and ethical business dealings with social groups and respect for the natural environment, is becoming another major factor in building a competitive advantage of enterprises (Wolak-Tuzimek et al., 2021). Social commitment is a major determinant of a positive reputation, an asset distinguishing an enterprise from its competitors, and thus a source of competitive advantage (Maráková et al., 2021).

Intellectual capital can be defined as all those intangibles an organisation has and which can be acquired or generated, assimilated, processed and implemented in a harmonious way in order to attain higher levels of innovation, productivity and competitiveness, in spite of not being reflected in financial statements (Ibarra-Cisneros et al., 2020). Intellectual capital is all the knowledge of employees, organizations and their ability to create added value and lead to sustainable competitive advantage (Handayani, Karnawati, 2019). The dimensions of intellectual capital development (human capital, relational capital, and structural capital) relate significantly with cost leadership and innovativeness. It is indicated that boosting intellectual capital development will lead to an enhanced competitive advantage of organizations (Blessing, 2022). Intellectual assets such as patents, trade secrets, human capital, and organizational structures are widely considered important components of business performance and economic growth. Intellectual capital is one of the organizational capabilities that have a positive impact on competitive advantage (Niwash et al., 2022).

The attainment of competitive advantage is indissolubly linked with the development of digital technologies (IT) (Awamleh, Ertugan, 2021). IT capabilities have been developed and widely adopted by many companies to collect, process, store and retrieve information (Galliers et al., 2020). IT has increased companies' ability to exploit opportunities and avoid threats and identified the business strategy's strengths and weaknesses (Chu et al., 2019). The role of ICT (Information and Communication Technologies) in business is seen in the way it will help companies become a lot more productive and improve their performance, save money, improve the client expertise, streamline communications, and enhance social control decision-creating. It additionally plays a role in helping corporations expand globally and in providing workers access to company data where and whenever they want (Deep, 2023). In the case of tourism, the broad applicability of Information and Communication Technologies gives rise to the concept of smart tourism (and the related tourism 4.0, smart tourism destination, smart

hospitality), which envisages enriching tourist experience and more effective destination actions by collecting, aggregating, and processing data sets (Almeida et al., 2021, Rula et al., 2021). These include artificial intelligence (AI), augmented reality/virtual reality (AV/VR), big data (BD), the Internet of Things (IoT), high performance computing, cloud computing, wireless connectivity, emerging technologies, and blockchain (Peceny et al., 2019; Ordóñez et al., 2022, Moghadasnian, 2024; Demirciftci, 2024).

This literature review has helped to identify the crucial competitiveness factors for tourist businesses that drive their competitive advantage. The hypothesis is advanced, therefore, that digitalisation is an important factor of tourist businesses' competitiveness.

### 3. Methods

In June 2024, a survey was conducted of individuals belonging to the generation Z, that is, born in 1995-2012. 332 surveys were completed correctly. The survey form was available with the Microsoft Forms platform and anyone interested was able to fill the questionnaire.

The original survey questionnaire consisted of two parts: personal data and questions. In the first, the respondents were to declare their age, gender, and education; in the empirical section, to determine the significance of the particular factors affecting the competitiveness of tourist businesses. The respondents' structure, based on the details received in the first part of the survey, is shown in Table 1.

**Table 1.**

*The structure of the research sample*

| Criterion        | The number of respondents | The respondents' structure |
|------------------|---------------------------|----------------------------|
| <b>Age</b>       |                           |                            |
| 18-20            | 84                        | 25.30                      |
| 21-22            | 108                       | 32.53                      |
| 23-25            | 112                       | 33.73                      |
| 25-30            | 28                        | 8.43                       |
| <b>Gender</b>    |                           |                            |
| Female           | 170                       | 51.20                      |
| Male             | 162                       | 48.80                      |
| <b>Education</b> |                           |                            |
| University       | 148                       | 44.58                      |
| Post-primary     | 184                       | 55.42                      |

Source: The authors' compilation.

Persons aged 18 to 30, i.e., members of the generation Z, took part in the study. Those aged 23-25, accounting for 33.73% of all the respondents, women (51.2%), and post-primary education holders (55.42%), prevailed.

The second section includes 2 questions, and the responses were recorded on 10-point ordinal scales. The results for the instruction: *Please determine the significance of the particular factors affecting the competitiveness of tourist businesses on the scale from 1 to 10, where 1 means a low significance and 10 a high significance*, are presented in this article. 20 factors (observable variables) are investigated, namely: product brand (V1), additional services to customers (V2), infrastructure – the proximity of restaurants, shops, and the like (V3), attractive geographical situation (V4), professional and competent staff (V5), professional standard of tailor-made services (V6), standards of accommodation, catering, and customer services (V7), anthropogenic qualities (V8), popularity of tourist destination (V9), the option of booking via a firm's website (V10), the option of booking via an Internet service (V11), the presence of a hotel on tourist portals (V12), an active presence in social media (V13), a hotel's attractive website (V14), an environment-friendly catering range of a hotel (V15), the use of renewable energy by a hotel (V16), an environment-friendly certification of a hotel (V17), positive reviews and recommendations from earlier customers (V18), attractive advertising campaign (V19), and loyalty programmes (V20).

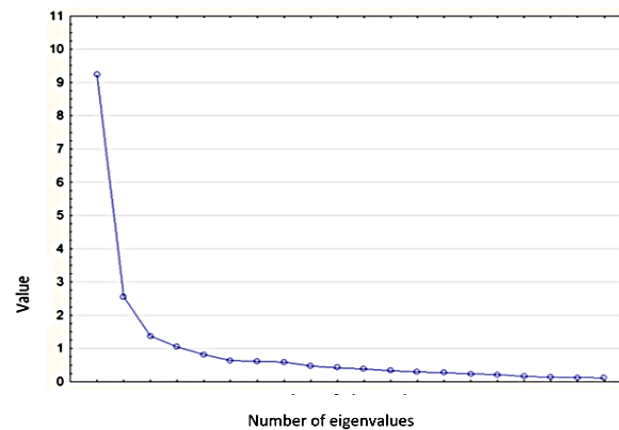
Exploratory factor analysis, which detects the optimum groups of main factors and explicates correlations among observable variables, serves to verify the research hypothesis. The method helps to reduce variables, identify a structure and general regularities among variables, verify the regularities and connections, describe and classify investigated objects in new, orthogonal spaces defined with new, emergent factors (Stanisz, 2007, p. 166).

The factor analysis procedure identified successive factors with maximum shares in explicating the variables. To this end, the input space was rotated according to the varimax criterion. A regression line was defined in space that maximises the variance (variability) of the first factor while minimising the variance around. Such a factor has the greatest eigenvalue (variance), that is, it explains most of the variability of an investigated phenomenon. Each subsequent factor determined most of the remaining variability not covered by a preceding factor. The number of factors to identify was determined based on Cattell's scree criterion (1966) in the form of a linear graph where the point needs to be found to the right of which the eigenvalues and Kaiser's criterion (1960) – according to which only the factors corresponding to eigenvalues above 1 are used – begin to slope mildly down. Statistica 12 software assisted with MS Excel 2016 spreadsheet serve as the tools of analysis.



## 4. Results

The number of factors was selected in line with Cattell's scree criterion by finding the point where the diagram begins to 'flatten out'. Following factor 4, the graph is becoming flatter than around the initial components, where a 'steep drop' of eigenvalues could be noted. A factor solution was chosen accordingly, as illustrated in Figure 1.



**Figure 1.** The eigenvalue scree diagram for the factors of tourist business competitiveness.

Source: The authors' research.

Based on Cattell's scree and Kaiser's criteria, four factors were selected whose eigenvalues are in the range  $\langle 1.05; 9.24 \rangle$ . The accumulated eigenvalue for the four factors is 14.21. In effect, this system of factors explains 71.06% of the overall variance and the model formulated below matches the investigated reality well.

**Table 2.**

*The eigenvalue matrix for the factors describing the determinants of tourist sector's competitiveness*

| Factor | Characteristic value | Percentage of general variance | Accumulated characteristic value | Accumulated percentage |
|--------|----------------------|--------------------------------|----------------------------------|------------------------|
| F1     | 9.24                 | 46.19                          | 9.24                             | 46.19                  |
| F2     | 2.55                 | 12.78                          | 11.79                            | 58.97                  |
| F3     | 1.37                 | 6.85                           | 13.16                            | 65.82                  |
| F4     | 1.05                 | 5.24                           | 14.21                            | 71.06                  |

Source: The authors' research.

The matrix of factor loads was subject to Varimax rotation that simplifies the interpretation of factors by minimising the number of variables needed to explain a given factor. Table 3 includes a matrix of loads for factors describing the determinants of the tourist sector's competitiveness, or the correlation between observable variables and factors introduced in the model. The minimum value of correlation qualifying it as important is assumed to be 0.7.

**Table 3.**

*The matrix of factor loads for factors describing the determinants of the tourist sector's competitiveness*

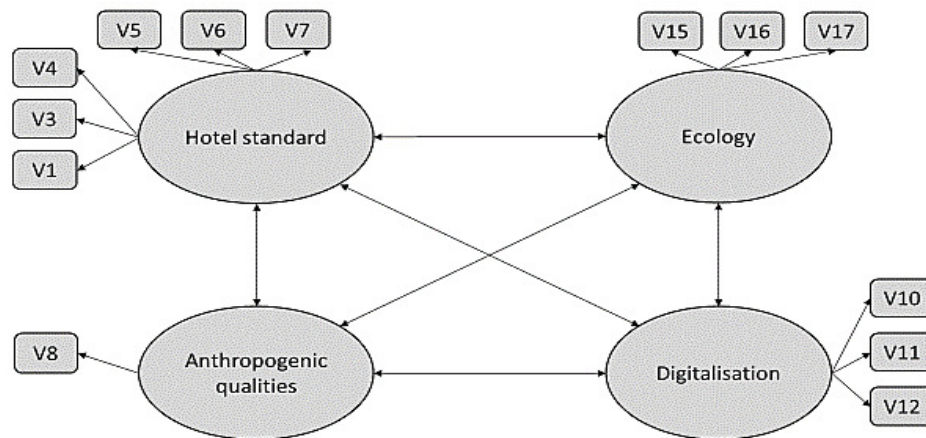
| <b>Factor loads (normalised Varimax)</b>                        |             |             |             |             |
|---|-------------|-------------|-------------|-------------|
| <b>Principal components (the loadings are greater than 0.7)</b> |             |             |             |             |
| Variable  | F.1         | F.2         | F.3         | F.4         |
| V.1   | <b>0.78</b> | 0.02        | 0.23        | 0.05        |
| V.2   | 0.69        | 0.25        | 0.14        | 0.14        |
| V.3   | <b>0.78</b> | 0.08        | 0.25        | 0.13        |
| V.4   | <b>0.79</b> | -0.01       | 0.09        | 0.24        |
| V.5   | <b>0.79</b> | 0.23        | 0.18        | 0.06        |
| V.6   | <b>0.71</b> | 0.29        | 0.17        | 0.24        |
| V.7   | <b>0.73</b> | 0.14        | 0.34        | 0.06        |
| V.8   | 0.38        | 0.27        | 0.06        | <b>0.74</b> |
| V.9   | 0.15        | 0.22        | 0.40        | 0.61        |
| V.10  | 0.43        | 0.10        | <b>0.81</b> | 0.09        |
| V.11  | 0.36        | 0.17        | <b>0.81</b> | 0.01        |
| V.12  | 0.21        | 0.23        | <b>0.76</b> | 0.34        |
| V.13  | 0.16        | 0.56        | 0.48        | 0.22        |
| V.14  | 0.28        | 0.56        | 0.59        | 0.18        |
| V.15  | 0.05        | <b>0.77</b> | 0.30        | 0.27        |
| V.16  | 0.06        | <b>0.87</b> | 0.09        | 0.20        |
| V.17  | 0.08        | <b>0.88</b> | -0.02       | 0.20        |
| V.18  | 0.59        | 0.13        | 0.44        | -0.08       |
| V.19  | 0.44        | 0.61        | 0.23        | -0.13       |
| V.20  | 0.39        | 0.64        | 0.22        | -0.23       |

Source: The authors' research.

The values greater than 0.7 and the variables loading the individual factors are shown in bold in Table 3. Factor one (F.1) explicates 46.19% of the overall variance and is represented with six variables, i.e., product brand (V1), infrastructure – the proximity of restaurants, shops, and the like (V4), professional and competent staff (V5), professional standard of tailor-made services (V6), standards of accommodation, catering, and customer services (V7). The second factor (F.2) explains 12.78% of the overall variance and is represented with three variables numbered 15-17, i.e., an environment-friendly catering range of a hotel (V15), the use of renewable source energy by a hotel (V16), an environment-friendly certification of a hotel (V17). Factor three (F.3) explicates 6.85% of the overall variance and is represented with three variables, namely, the option of booking via a firm's website (V10), the option of booking via an Internet service (V11), the presence of a hotel on tourist portals (V12). The fourth factor (F.4) explains 5.24% of the overall variance and is represented with a single variable: anthropogenic qualities (V8).

As suggested by the literature, factor names are to be derived from the names of variables with maximum factor loads or from a shared characteristic. Therefore, the first factor is named 'hotel standard', factor 2 – 'ecology', factor 3 – 'digitalisation', factor 4 – 'anthropogenic qualities'.

This terminology serves to develop a model of competitiveness factors of tourist businesses in the opinions of generation Z, shown in Figure 2.



**Figure 2.** A factor-based model of tourist sector's competitiveness as seen by generation Z.

Source: The authors' research.

The particular observable variables (positions on the scale) are represented with rectangles and the factors with ovals in Figure 2. The causal (regressive) relationships are shown with unidirectional arrows and correlation dependences with bidirectional arrows.

The exploratory factor analysis implies the respondents see four factors influencing the competitiveness of tourist entities, that is, the standard of a hotel, ecology, digitalisation, and anthropogenic qualities. The identified system of factor explains 71.26% of the whole variance, which means the model well matches the reality. The digitalisation factor is loaded with three variables: the option of booking via a firm's website, the option of booking via an Internet service, and the presence of a hotel on tourist portals, evidence of its impact on the competitiveness of tourist businesses. The results imply the hypothesis H, digitalisation is an important factor of tourist businesses' competitiveness, is verified positively.

## 5. Discussion

The literature review demonstrates most authors focus on studying the competitiveness factors of manufacturing enterprises (e.g. Cao et al., 2022), far fewer on the service sector (e.g. Kempa, 2017) or the customer's perspective (e.g. Maráková et al., 2023). Our results conform with or are similar to those reported by other authors.

An Accenture's investigation (2019) proved socially responsible efforts strongly influence the purchasing decisions of generation Z. S. Narayanan (2022) shows Gen Z values social and environmental CSR and are willing to reward companies with higher willingness to pay for their brands, higher purchase intention and increased brand equity.

Cultural and eco tourism have been studied by I.M. Wardana et al. (2019, where a quantitative approach is used with 147 respondents as sample). The research results give an indication that cultural preservation, natural environment, social environment, and local

community participation are the upmost elements in sustainable tourism development model and destination competitiveness enhancement.

The research by Karabulatova et al. (2021) into 4236 individuals from five countries was intended to study the socio-demographic characteristics of Gen Z and analyse them as consumers on the global travel service market. It has shown modern digital communications facilitate the adaptive transformation of the global tourism industry market to the needs of Gen Z, while the flexibility of the tourism industry to meet the needs of Gen Z allows the management of potential incremental costs to improve overall well-being and strengthen competitive advantage. A 'model of global market adaptation to Gen Z needs' is introduced, whose principal objective is to create an effective business model that could provide for the development of the global travel industry through the synthesis of modern digital technologies and social communication.

The tourist behaviour of (working and non-working) generation Z members has been examined by A. Niemczyk (2019). He investigated 610 persons aged 18-24. Pricing is identified as the main factor determining the destination, given the source of financing and the duration of stay (non-workers are sponsored by relatives and pay out of their own savings, staying for between a few days to a week). Travel is often organised on their own, using social media and ITC, among others.

O. Ławińska and A. Korombel (2023) have studied generation Z's behaviour in social media and expectations of managers' characteristics and competences. The generation's representatives as social media users pointed to instant interactive communication as the key reason and benefit. Thus, forming and maintaining long-term relationships with generation Z by means of social media, aware of the generation's changeable needs, are key to business success. K. Czernek-Marszałek's and P. Piotrowski's 2021/2022 study (2022) of 22 entrepreneurs from four sections of the tourist industry (night accommodation, tourist attractions, travel agencies, and MICE businesses) proves the digitalisation processes accelerated by the COVID-19 pandemic fostered the implementation of digital solutions to tourist businesses (including remote working, remote contacts with customers, suppliers, and other partners, technical and technological solutions enhancing public security), which drove enterprise development in diverse ways, e.g. improving the competences of workers and management, higher sales, competitive advantages, and saving resources.

An investigation of 970 generation Z persons by A. Stavrianeai and I. Kamenidou (2021) implies a positive impact of online accommodation booking on their intentions for the present and future stays at a given facility. S. Mohseni and co-authors (2018) note tourist firms' websites may draw tourists and affect their purchasing decisions. Answers from 409 respondents suggest the attractive websites of tourist operators have a positive impact on their effectiveness.

These results suggest a great diversification of the sources of competitive advantage. One of them is digitalisation, which brings a range of benefits enabling more effective operations, an improved adaptation to customers' requirements, and the creation of unique offers. This is reaffirmed by both our research and the results from other authors.

## 6. Conclusion

The consumption model of generation Z is strongly grounded in virtual reality and founded upon mobile technologies. Young consumers move around the web freely, treating the Internet as the most convenient and cheapest way of making decisions and shopping by means of their smartphones and tablets.

Digitalisation allows contemporary tourist businesses to reach a wide range of clients via the Internet and social media. Websites, mobile applications, and booking platforms help promote offers globally, enhancing visibility and availability to potential tourists. What's more, state-of-the-art technologies provide for tailor-made customer experience, automation of booking and payment processes, and faster and more effective communication with customers. Those taking advantage of the above factors can gain an edge on the tourist market.

Our results, generated by means of exploratory factor analysis, suggest digitalisation, defined by the option of booking via an operator's website or Internet service and a hotel's presence at tourist portals, is a major factor of tourism competitiveness, thus upholding our research hypothesis.

To sum up, digitalisation can be said to greatly improve that competitiveness, enabling tourist businesses to better adapt to customer needs, allowing for operational optimisation, introduction of innovative solutions, and reaching the global market. A proper use of digital technologies can bring substantial benefits and competitive advantage in the dynamically changing tourist market.

The results may serve as recommendations for managers to identify the crucial competitiveness factors of tourist entities. Using digitalisation as a source of competitive advantage will help the tourism sector not only to attract but also build long-term relationships with generation Z customers.

## References

1. Accenture (2019). *Jak kupuje generacja Z. Raport*, <https://branden.biz/wp-content/uploads/2019/04/Accenture-raport-2019.pdf>
2. Almeida, F., Santos, J.D., Monteiro, J.A. (2020). The Challenges and Opportunities in the Digitalization of Companies in a Post-COVID-19 World. *IEEE Engineering Management Review*, Vol. 48, No. 3, pp. 97-103, DOI: 10.1109/EMR.2020.3013206
3. Awamleh, F.T., Ertugan, A. (2021). The Relationship Between Information Technology Capabilities, Organizational Intelligence, and Competitive Advantage. *SAGE Open*, No. 11(2), 15824402110152. DOI: 10.1177/21582440211015201.
4. Blessing, D. (2022). Intellectual Capital Development and Competitive Advantage. *International Journal of Academic Research in Economics and Management Sciences*, No. 6 (7), pp.1-8. ISSN: 2643-900X
5. Cao, C., Tong, X., Chen, Y., Zhang, Y. (2022). How top management's environmental awareness affect corporate green competitive advantage: evidence from China. *Kybernetes*, No.51(3), pp. 1250-1279. DOI: 10.1108/K-01-2021-0065.
6. Cattell, R.B. (1966). The Scree Test for the Number of Factors. *Multivariate Behavioral Research*, No.1 (2), pp. 245-276, DOI: 10.1207/s15327906mbr0102\_10.
7. Chu, Y., Chi, M., Wang, W., Luo, B. (2019). The Impact of Information Technology Capabilities of Manufacturing Enterprises on Innovation Performance: Evidences from SEM and fsQCA. *Sustainability*, No. 11(21). DOI: 10.3390/su11215946
8. Czernek-Marszałek, K., Piotrowski, P. (2022). Cyfryzacja w przedsiębiorstwach turystycznych w warunkach COVID-19. Pozytywne i negatywne konsekwencje. *Przegląd Organizacji*, No. 4(987), pp. 3-12. DOI: 10.33141/po.2022.04.01
9. Deep, A. (2023). Role of ict in business management: a conceptual review. *International Journal of Creative Research Thoughts (IJCRT)*, Vol. 8, Iss. 8, pp. 749-756. DOI:10.13140/RG.2.2.16629.14566.
10. Demirciftci, T. (2024), Internet of Things (IoT) in the Tourism Industry. In: C. Tanrisever, H. Pamukçu, A. Sharma (Eds.), *Future Tourism Trends, Vol. 2 (Building the Future of Tourism)* (pp. 49-58). Leeds: Emerald Publishing Limited, <https://doi.org/10.1108/978-1-83753-970-320241003>
11. Dolot, A. (2018). The characteristics of generation Z. *e-mentor*, No. 2(74) pp. 44-50, <http://dx.doi.org/10.15219/em74.1351>.
12. Dresh, A., Collatto, D., Lacerda, D.P. (2018). Theoretical under standing between competitiveness and productivity: firm level. *Ingeniería y competitividad*, Vol. 20, No. 2, DOI: 10.25100/iyc.v20i1.5897

13. Galliers, R.D., Leidner, D.E., Simeonova, B., Agarwal, R., Sambamurthy, V. (2020). Principles and models for organizing the IT function. *Strategic Information Management*. Routledge, pp. 243-260.
14. Ibarra-Cisneros, M.A., Hernández-Perlines, F., Rodríguez-García, M. (2020). Intellectual capital, organisational performance and competitive advantage. *European Journal of International Management*, Vol. 14, No. 6, pp. 976-998. DOI: 10.1504/EJIM.2020.10021761
15. Jayatissa, D. (2023). Generation Z – A New Lifeline: A Systematic Literature Review. *Sri Lanka Journal of Social Sciences and Humanities*, No. 3(2), pp. 179-186. DOI: 10.4038/sljssh.v3i2.110.
16. Kaiser, H.F. (1960). The Application of Electronic Computers to Factor Analysis. *Educational and Psychological Measurement*, 20(1), 141-151. <https://dx.doi.org/10.1177/001316446002000116>
17. Karman, A., Banaś, J., Bronisz, U., Miszczuk, A. (2022). Zmiany klimatu a konkurencyjność regionów. *KPZK*, vol. 14/206. Warszawa: PAN, pp. 31-58. ISBN: 978-83-66847-41-5
18. Kempa, E. (2017). Poziom konkurencyjności na rynku usług turystycznych i rekreacyjnych w Polsce na tle wybranych krajów Unii Europejskiej. *Aurobusy*, No. 6, pp. 1695-1698.
19. Kerdpitak, C., Pungnirund, B., Hotrawaisaya, C., Jariyachamsit, S., Yen, W., Chantranon, S. (2022). Effect of competitive advantage, digital marketing to supply chain management on tourism business performance in Thailand. *Uncertain Supply Chain Management*, 10(3), pp. 721-728. DOI:10.5267/j.uscm.2022.5.003.
20. Kowalska, K. (2018). Konkurencyjność podmiotów sharing economy w turystyce. *Teoretyczne problemy rozwoju turystyki*, No 2(42), pp. 19-27. DOI: 10.18276/ept.2018.2.42-02
21. Ławińska, O., Korombel, A. (2023). *Pokolenie Z jako wyzwanie współczesnego zarządzania przedsiębiorstwem. Relacje, media społecznościowe i crowdsourcing*. Wydawnictwo Politechniki Częstochowskiej. ISBN 978-83-7193-941-9. DOI: 10.17512/CUT/9788371939426
22. Lestari, S.D., Leon, F.M., Widyastuti, S., Brabo, N.A., Putra, A.H.P.K. (2020). Antecedents and consequences of innovation and business strategy on performance and competitive advantage of SMEs. *The Journal of Asian Finance, Economics and Business*, 7(6), pp. 365-378. DOI: 10.13106/JAFEB.2020.VOL7.NO6.365
23. Maráková, V., Wolak-Tuzimek, A., Lament, M., Dzuríková, L. (2023). The competitive advantage of enterprises from the customer perspective. *E&M Economics and Management*, 26(3), 158-175. <https://doi.org/10.15240/tul/001/2023-3-010>

24. Maráková, V., Wolak-Tuzimek, A., Tučková, Z. (2021). Corporate Social Responsibility as a source of competitive advantage in large enterprises. *Journal of Competitiveness*, 13(1), pp. 113-128.
25. Maslova, T. (2020), Ways to increase the competitiveness of enterprises. In: *Sustainable Public Procurement: challenges and opportunities*. Chişinău, Republica Moldova.
26. Mehta, A.M., Ali, F. (2020). Dynamic managerial capabilities, competitive advantage and business performance: an integrative model, literature review and research propositions. *Academy of Strategic Management Journal*, No. 19, Iss. 4. DOI: 1939-6104-19-4-584
27. Moghadasnian, S. (2024). *Tourism 4.0 in Iran: Navigating the Digital Transformation for Sustainable and Inclusive Growth*. Conference: The 13th International Conference on Tourism, Culture and Art. Tbiliseli, Georgia.
28. Mohseni, S., Jayashree, S., Rezaei, S., Kasim, A., Okumus, F. (2018). Attracting tourists to travel companies' websites: The structural relationship between website brand, personal value, shopping experience, perceived risk and purchase intention. *Current Issues in Tourism*, No 21(6), pp. 616-645. DOI: 10.1080/13683500.2016.1200539
29. Narayanan, S. (2022). Does Generation Z value and reward corporate social responsibility practices? *Journal of Marketing Management*, No 38(6), pp. 1-35. DOI:10.1080/0267257X.2022.2070654.
30. Niemczyk, A. (2019). Zachowania turystyczne pracujących i niepracujących przedstawicieli pokolenia Z – wybrane problemy. In: M. Dębski, U. Żuławska (eds.). *Produkt turystyczny. Innowacje-marketing-zarządzanie*. Łódź/Warszawa: Wydawnictwo Społecznej Akademii Nauk. ISSN 2543-8190
31. Niwash, M.N.K., Cek, K., Eyupoglu, S.Z. (2022). Intellectual Capital and Competitive Advantage and the Mediation Effect of Innovation Quality and Speed, and Business Intelligence. *Sustainability*, No. 14(6), 3497. <https://doi.org/10.3390/su14063497>
32. Ordóñez, M., Gómez, A., Ruiz, M., Ortells, J., Niemi-Hugaerts, H., Juiz, C., Jara, A., Butler, T. (2022). *IoT Technologies and Applications in Tourism and Travel Industries*. 10.1201/9781003338611-8
33. Oxford Economics (2021). *Gen Z's Role in Shaping the Digital Economy. Report. Economic Consulting Team Oxford Economics*, <https://doi.org/10.3390/su11215946>, <https://www.oxfordeconomics.com/resource/gen-z-role-in-shaping-the-digital-economy/>
34. Peceny, U.S., Urbančič, J., Mokorel, S., Kuralt, V., Ilijaš, T. (2019). Tourism 4.0: challenges in marketing a paradigm shift. In: M. Reyes (ed.). *Consumer Behaviour and Marketing*. IntechOpen, DOI: 10.5772/intechopen.84762
35. Piotrowska, A. (2019). Konkurencyjność przedsiębiorstw – główne aspekty i uwarunkowania. *Przegląd Nauk Ekonomicznych*, No. 32, pp. 9-21.
36. Piotrowska, K. (2022), *Zoomersi w pracy, czyli jak Pokolenie Z podbija rynek pracy w Polsce*. Warszawa: Cpl, <https://landing.cpl.com/Zoomersi-w-pracy/raport.html>



37. Porter, M.E. (1990). *The competitive Advantage of Nations*. New York: The Free Press.
38. Rula, A., Hamid, A.S., Albahri, Jwan, K., Alwan, Z.T., Al-qaysi, O.S., Albahri, A.A., Zaidan, Alhamzah Alnoor, A.H., Alamoodi, B.B., Zaidan, A.A. (2021). How smart is a tourism? A systematic review of smart tourism recommendation system applying data management. *Computer Science Review, No 39*. DOI: 10.1016/j.cosrev.2020.100337
39. Stankiewicz, M.J. (2005). Konkurencyjność przedsiębiorstwa. In: *Budowanie konkurencyjności przedsiębiorstwa w warunkach globalizacji*. Toruń: Dom Organizatora. ISBN: 83-7285-222-2
40. Stavrianea, A., Kamenidou, I. (2021). Zgodność z transformacją cyfrową w rezerwacji online poprzez wartości doświadczalne pokolenia Z. *European Journal of Tourism Research, No 30*, 3003. <https://doi.org/10.54055/ejtr.v30i.2590>
41. Vîrjan, D., Manole, A.M., Stanef-Puică, M.R., Chenic, A.S., Papuc, C.M., Huru, D., Bănac, C.S. (2023). Competitiveness—the engine that boosts economic growth and revives the economy. *Frontiers in Environmental Science, Vol. 11*, DOI:10.3389/fenvs.2023.1130173, ISSN: 2296-665X
42. Wardana, I.M., Sukaatmadja, I.P.G., Yasa, N.N.K., Astawa, I.P. (2019). Cultural Tourism and Ecotourism Empowerment in the Sustainable Tourism Development and Destination Competitiveness Enhancement. *Journal of Environmental Management and Tourism, Vol. X, No. 4(36)*, 753-762. DOI:10.14505/jemt.v10.4(36).06
43. Wolak-Tuzimek, A., Duda, J., Sieradzka, K. (2021). Sources of competitive advantage of enterprises in selected sectors of the Polish economy. *European Research Studies Journal, Vol. XXIV, Iss. 3B*, pp. 284-298. DOI: 10.35808/ersj/2465



## FACTORS DETERMINING KNOWLEDGE HIDING IN MEDIUM AND LARGE ENTERPRISES IN POLAND

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**Purpose:** The aim of the article was to capture factors associated with knowledge hiding in Polish enterprises. This was important due to the negative impact of a lack of knowledge sharing on the functioning of organisations. On the one hand, the author attempted to verify previous assumptions; on the other hand, a new category of variables in the form of emotions accompanying cooperation with colleagues was taken into account in the study.

**Design/methodology/approach:** The study drew on previous publications identifying the dimensions of knowledge hiding. Based on the CATI method, empirical material was obtained from 575 employees of Polish enterprises, some of which was used in the presented study. Four formulated hypotheses were tested using Spearman's rank correlation coefficient.

**Findings:** The study showed that frustration was the main negative emotion associated with knowledge hiding, particularly in the case of remote work. Yet, no significant statistical correlations were observed between positive emotions and the mitigation of knowledge hiding. Other factors clearly related to knowledge hiding in Polish enterprises were the pressure to innovate and the perceived general atmosphere of competitiveness.

**Research limitations/implications:** Due to the fact that only approximately 20% of respondents admitted to hiding knowledge, the research would need to be repeated on a much larger sample.

**Practical implications:** The study results may allow for modification of enterprise policies regarding pro-innovation activities in the context of the possibility of sharing knowledge between employees.

**Originality/value:** Certain statistical correlations between emotions associated with collaboration and the dimensions of knowledge hiding were observed. Most of the earlier studies suggested such correlations based on observation of other variables.

**Keywords:** knowledge hiding, knowledge management, medium and large enterprises, Polish enterprises, interpersonal relations.

**Category of the paper:** Research paper.

## 1. Introduction

The development of digital technologies has contributed to rapid changes in the structure of societies, primarily transforming industrial societies into a new type known as the information society or network society. The changes were mainly based on the employment of a greater percentage of workers in the service sector, while industry and agriculture began to constitute an increasingly narrow margin. At the same time, the knowledge economy (Westlund, 2006) and the sharing economy became more important (Castaneda, Cuellar, 2020). Therefore, more and more research focused on improving the quality of knowledge sharing, both within and between organisations (Barney, 1991; Foss et al., 2009; Delery, Roumpi, 2017). Although knowledge sharing remains a popular research topic, the number of publications on knowledge hiding has increased over the past decade.

Researchers addressing that issue look for factors contributing to knowledge hiding in enterprises and for variables that may limit that tendency. In this regard, the dimensions of knowledge hiding were determined (Connelly et al., 2012), associated with psychological, relational and structural factors. Previous papers considered factors such as the dark triad (Karim, 2022; L. Wang et al., 2024a; Y. Wang et al., 2024b), alignment of HR systems and relational climates (Batistič, Poell, 2022) or workplace ostracism, *inter alia* (Han et al., 2024).

The aim of this paper was to identify the determinants of knowledge hiding in medium and large companies with more complex interpersonal relationship structures. Emotions accompanying online and offline collaboration, as well as the organisational atmosphere consisting of attitudes towards innovation and competitiveness were considered the factors that could potentially influence knowledge hiding. The research was conducted in December 2022, with the participation of employees of Polish enterprises with over 50 employees. Four research hypotheses were adopted and statistically verified.

The remainder of the article presents a review of the literature on knowledge sharing and knowledge hiding, research methodology, statistical analysis of research results and a discussion.

## 2. Literature review in the field of knowledge hiding

The social relations created and modified within an organisation translate into the efficiency of its functioning. Therefore, identifying and explaining factors that negatively affect such relations is an important aspect of research in the social sciences. One such negative phenomenon is knowledge hiding. It contributes directly or indirectly to the following problems: limiting the imagination and creativity, both at the group and individual level (Holten

et al., 2016; Kurniawanti et al., 2023); undermining the reputation of those from whom knowledge is hidden, which may result in them resigning from working in a given organisation (Butt, 2019); reduced individual, team and organisational performance (Hameed et al., 2012); reduced trust between employees (Connelly et al., 2012). It has also been noticed that the escalation of such conduct can easily spread down the hierarchy system, especially in work environments with high distrust and low competitiveness (Kurniawanti et al., 2023). Knowledge hiding is therefore more likely to occur in complex organisational structures, where there are more potential places for the emergence of that phenomenon. However, some studies indicate that knowledge sharing and knowledge hiding coexist in enterprises as related phenomena. They are associated with the notion of coopetition, i.e. simultaneous cooperation and competition. Based on that approach, excessive communication and reliance on a common knowledge base may limit the potential of employees to use their cognitive abilities, which may also inhibit the development of innovation (Yao et al., 2023).

When considering the issue of lack of knowledge sharing between employees, it would be possible to take into account previous research and re-examine the data in terms of the negative impact on knowledge sharing. However, such an approach would not address the problem of deliberate hiding of knowledge from work colleagues (Batistič, Poell, 2022). The concept of knowledge hiding is treated by some authors as an element of a broader phenomenon referred to as knowledge withholding. In addition to knowledge hiding, the following are also considered: knowledge-sharing hostility, knowledge contribution loafing and knowledge disengagement. That broader view covers both intentional and accidental behaviour that prevents knowledge from spreading throughout the organisation (Gonçalves, Curado, Oliveira, 2023).

A considerable amount of the literature produced over the last decade is based on the typology of dimensions of knowledge hiding proposed by Connelly et al. (2012). Those dimensions are considered at the behavioural and motivational levels and are referred to as playing dumb, evasive hiding and rationalised hiding. Playing dumb is a behavioural strategy in which persons who hide knowledge pretend to be ignorant and convince others of their lack of knowledge in a given field. Evasive hiding involves giving incorrect or incomplete information. In this case, the persons hiding knowledge do not want to be treated as ignorant but are also unable to formulate a good "excuse" as to why they do not wish to provide the information. Rationalised hiding, in turn, is a strategy in which a co-worker or supervisor indicates external reasons for hiding knowledge or blames a third party who, in their opinion, does not allow information to be shared (Farooq, Sultana, 2021).

Previous studies have revealed a number of factors that may contribute to knowledge hiding. As Yang and Lin (2023) showed, trust towards leaders and the strength of employee identification with them contribute to knowledge sharing and a greater tendency toward transparency in cyberspace. Meanwhile, negative relations, such as toxic leadership, foster knowledge hiding. The level of distrust is one of the key variables influencing the decision of

a person to share knowledge or hide it (Farooq, Sultana, 2021). A factor limiting the tendency to hide knowledge may be the awareness of possible support from other members of the organisation. The assumption here is that signalling a desire to support can lead to altruistic behaviour, which can trigger a response in the form of the reciprocity of assistance (Batistič, Poell, 2022). When individuals are alienated and subjected to some form of ostracism, they are more likely to withhold information from others. More or less overtly revengeful behaviours may occur (Han et al., 2024), which may lead to a negative reaction in the form of vendetta. The conservation of resources theory assumes that ostracism is a major factor in knowledge hiding (Han et al., 2024).

Sometimes, isolation may be the consequence of placing a person in a position well below the employee's expectations. In such a case, they often have the feeling of being over-qualified. If employees discover that their competencies are much higher than those required for a given position, this may lead to "job boredom". Consequently, they begin to experience frustration, dissatisfaction and anxiety - a range of negative emotions. When comparing themselves with work colleagues, they may feel that they are not appreciated enough and are not able to make full use of their potential. Hiding knowledge in this case becomes a substitute for power and a sense of control. It may also be the result of a fear of such employees that they will no longer be needed if they share their unique knowledge. The perception of inequality or unfair treatment is likely to lead to retaliatory behaviour (Khan et al., 2024). Research indicates that the introduction of "organisational justice" by senior employees contributes to greater comfort at work and a reduction in the tendency to hide knowledge. Importantly, that trend is evident not only in behavioural acts but also in the intentions of employees (Mahmood et al., 2023).

There are structural possibilities to limit the negative phenomenon of avoiding knowledge sharing. In specific cases, changes in the composition of teams may contribute to the above, although in general, the consolidation of good relations between employees and intragroup integration favour knowledge sharing. Hiding knowledge is associated with a sense of "rootedness", and inequalities in established social structures may lead to the alienation of some employees (see Zhang, Takahashi, 2024). Knowledge hiding can also be influenced by the general competitive atmosphere within an enterprise. In that case, knowledge is hidden strategically and treated as a unique resource, it may even be one of the rules in that type of organisations (Khoreva, Wechtler, 2020; Yao et al., 2023).

In addition to relational aspects, personality variables are also identified as factors contributing to knowledge hiding. Clear correlations were noticed in the case of the dark triad: Machiavellianism, psychopathy and narcissism. In a study by Pan et al. (Pan et al., 2016), Machiavellianism was found to be a clear predictor of knowledge hiding, and subsequent studies confirmed that all three components of the dark triad were the predictors (Pan et al., 2018; Karim, 2022). Those features lead to more egoistic attitudes in the workplace at the expense of altruistic attitudes and are less likely to involve empathy towards other employees (Karim, 2022).

Considering the several dimensions of knowledge hiding proposed by Conelly et al. (2012) allows for a better determination of the cases in which it may cause positive or negative effects. When individuals rationalise such behaviour, their well-being and good opinion of themselves as co-workers decline. To rationalise such conduct, they have to engage emotionally, which causes stress and a reduction in overall comfort. In the short term, however, they achieve high innovative performance. In contrast, evasive hiding and playing dumb are effortless and do not lead to lower well-being or reduction of employee performance (Khoreva, Wechtler, 2020). In research on the correlation between knowledge hiding and the dark triad, it was noticed that narcissists are involved in both playing dumb, evasive hiding and rationalised hiding. Individuals with high rates of psychopathy avoid playing dumb, while evasive hiding is unlikely to occur in Machiavellian personalities. This is explained by the fact that playing dumb requires a diplomatic, empathetic approach, which is not the feature of psychopathic individuals, whereas Machiavellians may lose a lot if fraud is detected, which is an element of the evasive hiding strategy (Y. Wang et al., 2024a).

If one considers Machiavellian intelligence essential for efficient group operation and management, the evasive hiding strategy is particularly unfavourable in the case of leaders. This is because the group led by the leader expects action at a high level of competence. Provision of incomplete or false information, if discovered, may result in weakening the authority of the superior. Consequently, such behaviour contributes to several negative symptoms in leaders, such as low self-confidence, high need for self-control, depression, high level of anxiety and lower self-esteem (L. Wang et al., 2024b). The discussed issue may be considered a bit more broadly in the context of expecting knowledge transfer from other employees. Individuals who share knowledge proactively, including leaders, are less appreciated when information is not shared than those who tend to pass on knowledge reactively (see Yao et al., 2023).

Although the problem of knowledge hiding is exploited in an increasing number of publications, it is worth looking for new approaches and identifying further variables related to that phenomenon. Research findings may vary depending on organisational culture, therefore it is beneficial to conduct the studies in societies where little research has been conducted in that area to date.

### **3. Research method**

The research to identify factors associated with knowledge hiding in Polish enterprises was conducted in December 2022. It was part of a broader study on social capital, knowledge sharing and interpersonal relations conducted by the employees of the Czestochowa University of Technology in the Department of Applied Sociology and Human Resource Management.

The research was quantitative in nature and was carried out using the CATI technique. The study respondents were selected randomly and the sampling frame was the REGO database of Polish enterprises; only companies employing more than 50 people were included in the research. The sample size was 575 persons. There were 1,532 participants at the beginning of the study, but 957 of them interrupted the interview without being able to complete it at a later date.

When examining the phenomenon of knowledge hiding, a distinction was made between the dimensions indicated by Conelly et al. (2012), 4 questions relating to each of the dimensions, i.e. playing dumb, evasive hiding and rationalised hiding were included in the interview questionnaire. The form of the questions was a five-point Likert scale.

Taking into account the results of previous studies that indicated the role of emotions in the phenomenon of knowledge hiding (Khoreva, Wechtler, 2020; Batistič, Poell, 2022; Khan et al., 2024; L. Wang et al., 2024b), the following hypotheses were adopted:

- H1: Hiding knowledge by an employee is associated with the occurrence of negative emotional states, in particular anxiety, frustration and disappointment.
- H2: Positive emotions, in particular, satisfaction and a sense of support, may negatively affect knowledge hiding.

To determine which emotions accompanied the respondents in their relations with work colleagues, they were asked about the strength of the experienced positive emotions (contentment, satisfaction, kindness, sense of community, sense of support, interest, enthusiasm, relaxation, confidence) and negative ones (sadness, loneliness, anxiety, disappointment, frustration, discouragement, anger, shyness, jealousy, overwhelm). The questions on a five-point Likert scale referred to situations where employees communicated with others both directly and remotely.

One of the ambiguous results in previous studies was the correlation between innovation (creativity) and the tendency to hide knowledge. While innovativeness may influence the willingness to share knowledge, knowledge hiding may favour it (Khoreva, Wechtler, 2020; Yao et al., 2023). Taking the above into account, another hypothesis was adopted:

- H3: An innovative environment may influence knowledge hiding, above all, the emphasis on employee individual achievements in that area may promote knowledge hiding.

Earlier studies also indicated that although knowledge sharing should promote competitiveness, the competitive atmosphere within the organisation may contribute to knowledge hiding. Therefore, the following hypothesis was adopted:

- H4: The competitive atmosphere and sense of success of an organisation translate into the tendency to hide knowledge.

The indicators for H3 and H4 were the answers of the respondents to the questions on creativity, innovation, assessment of competitiveness and financial success at individual and organisational levels.



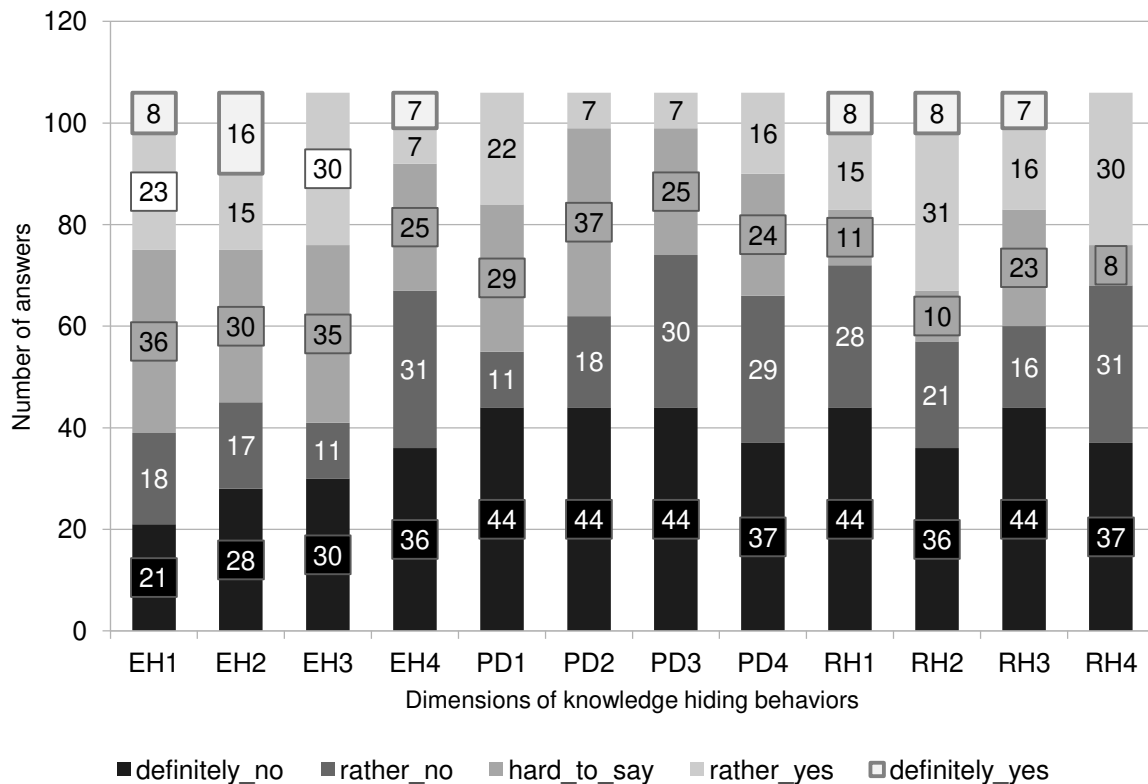
## 4. Study results

To determine the dimensions of knowledge hiding in large and medium-sized enterprises in Poland, the respondents were asked four questions relating to each of the three analysed dimensions. The task of the respondents was to recall a situation when they had withheld knowledge and to determine to what extent they agreed with the following statements:

- for the evasive hiding (EH) dimension: I agreed to help the person but I never really intended to (EH1); I agreed to help the person but I provided different information instead (EH2); I informed the person that I would help him/her later, but I delayed my assistance (EH3); I offered the person different information to what he/she wanted (EH4).
- for the playing dumb (PD) dimension: I pretended I didn't have up-to-date information (PD1); I said I didn't know the answer, even though I did (PD2); I pretended I didn't know what that person was asking for (PD3); I said I wasn't very knowledgeable about the subject (PD4).
- for the rationalised hiding (RH) dimension: I explained that I wanted to help but I could not (RH1); I explained that the information was confidential and only for authorised persons (RH2); I informed the person that top management did not allow anyone to share such knowledge (RH3); I refused to help (RH4).

Prior to that, a filter question was asked to verify whether the employee hid knowledge from time to time. As a result, only 106 out of 575 respondents admitted that they sometimes hid knowledge. In the group of respondents selected in such a way, the playing dumb strategy was least likely to be used. None of the respondents confirmed that they definitely used that strategy in the workplace, while 7 to 22 persons admitted that they rather used it. For evasive hiding, 14 to 31 persons admitted that they definitely used that strategy, while for rationalised hiding, 23 to 39 respondents confirmed using it. Evasive hiding was the least frequently rejected strategy by the employees (the lowest number of "rather not" and "definitely not" responses). Detailed data is presented in Figure 1.

Spearman's rank correlation coefficient was used to verify the hypotheses, as all variables were obtained through questions on an ordinal Likert scale. As the number of persons declaring knowledge hiding was not large, a small number of significant statistical correlations were detected, and the Spearman coefficient values were low. When verifying the hypotheses,  $p < 0.05$  was assumed.



**Figure 1.** Comparison of dimensions of knowledge hiding among surveyed employees. EH stands for evasive hiding, PD stands for playing dumb, RH stands for rationalised hiding. N = 106.

Source: own elaboration.

H1 was partially positively verified. Knowledge hiding, particularly in the case of playing dumb strategy, correlated with negative emotions. However, those emotions were not anxiety or disappointment. Instead, frustration was associated with all the dimensions of knowledge hiding. This was particularly true for remote working. Furthermore, it was noticed that the emotion accompanying knowledge hiding was discouragement. Both of the emotions can be associated with a high level of stress and a tendency to isolate, which confirms the research findings so far.

Considering positive emotions, their role in limiting knowledge hiding seems questionable. Only partially, one of the dimensions of knowledge hiding correlated negatively with satisfaction and kindness. The the case of the sense of support, there were no significant statistical correlations. Moreover, the sense of community correlated positively with the evasive hiding and playing dumb strategies. Thus, H2 should be rejected. Spearman's rank correlation coefficient values are presented in Table 1.

**Table 1.**

*Observed correlations between emotions accompanying interpersonal communication and dimensions of knowledge hiding*

| Experienced emotions | EH1                  | EH2     | EH3     | EH4     | PD1     | PD2     | PD3      | PD4     | RH1 | RH2     | RH3     | RH4     |
|----------------------|----------------------|---------|---------|---------|---------|---------|----------|---------|-----|---------|---------|---------|
|                      | REMOTE COMMUNICATION |         |         |         |         |         |          |         |     |         |         |         |
| Satisfaction         |                      |         |         |         |         |         | -.192055 |         |     |         |         |         |
| Kindness             |                      |         |         |         |         |         | -.211517 |         |     |         |         |         |
| Sense of community   |                      |         | .195342 |         |         |         |          | .242596 |     |         |         |         |
| Sadness              |                      |         |         |         |         |         |          |         |     |         |         | .221257 |
| Frustration          |                      | .254814 | .196461 | .191580 | .247238 | .218337 | .239921  | .252070 |     | .308160 | .262846 | .230190 |
| Discouragement       |                      |         |         |         |         |         |          |         |     | .232983 |         |         |
|                      | DIRECT COMMUNICATION |         |         |         |         |         |          |         |     |         |         |         |
| Frustration          |                      |         |         |         |         | .193163 |          |         |     |         |         |         |
| Discouragement       |                      |         |         |         | .210430 | .205072 |          |         |     |         |         |         |
| Anger                |                      |         |         |         |         | .196191 |          |         |     |         |         |         |

Note. The table shows Spearman's rank correlation coefficient values only for situations where there was a statistically significant correlation between the variables for  $p < 0.05$ .  $N = 106$ .

Source: own elaboration.

To verify H3, the employees' assessment of their environment in terms of innovation was taken into account. There were questions about the expectation of innovation and creativity from employees, the employees were also asked to evaluate the management's innovation efforts. Additionally, the assessment of the organisation's research and development activities was taken into account. For the majority of results regarding expectations and support for innovation, a positive correlation was observed with one of the dimensions of knowledge hiding, but no dimension was favoured. Thus, H3 was positively verified. In one case, however, a negative correlation was observed. The increase in employee innovation translated into a lower tendency to use the rationalised hiding strategy. It can be assumed that if all work colleagues show innovative tendencies, there are fewer opportunities for an individual to stand out. However, if pressure is introduced (expectations from superiors, support from the management), there may be more personal relations between the employees and the context of acting as a group seems less important. Statistical correlations between individual components of the innovative work environment variable and dimensions of knowledge hiding are presented in Table 2.

**Table 2.**

*Observed correlations between the assessment of the work environment innovativeness and dimensions of knowledge hiding*

|  | EH1     | EH2     | EH3     | EH4     | PD1     | PD2     | PD3     | PD4     | RH1     | RH2      | RH3     | RH4     |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|---------|---------|
| Increase in employee innovation                                  |         |         |         |         |         |         |         |         |         | -.197299 |         |         |
| Known development of innovative activities                       |         |         | .220337 |         |         |         |         | .240942 | .198906 |          |         |         |
| Expectation of employee development to support innovation        |         |         |         |         |         |         |         |         |         | .234924  |         |         |
| Appropriate use of employee creativity                           |         | .263901 | .204855 | .210052 |         | .311293 |         |         |         | .245162  | .246099 |         |
| Successful innovations resulting in envy from work colleagues    |         |         | .209483 |         |         | .254672 |         |         |         |          |         |         |
| Expectation of employee creativity and innovation                | .266357 |         |         |         |         |         |         |         |         |          |         |         |
| Assistance from the management in implementing innovation        | .195271 | .312162 |         |         |         |         | .225298 | .214627 |         | .244081  | .204376 |         |
| Communication of the expectation of innovation by the management |         |         | .224283 |         |         |         |         |         |         |          |         |         |
| Supporting innovative solutions by the management                |         |         | .215691 |         |         |         |         | .208428 |         |          |         |         |
| Increase in research and development activity                    |         |         | .229945 |         | .202098 | .294436 | .210678 |         | .224044 | .191979  | .230137 |         |
| Preference for innovation and originality                        |         |         |         |         |         |         |         |         |         |          |         | .191595 |

Note. The table shows Spearman's rank correlation coefficient values only for situations where there was a statistically significant correlation between the variables for  $p < 0.05$ .  $N = 106$ .

Source: own elaboration.

The last hypothesis assumed that the general competitive atmosphere could translate into knowledge hiding. While earlier works focused on competitiveness between employees, the presented research dealt with the general assessment of the competitiveness of a given enterprise. In the analysed cases, a positive correlation was observed between the assessment of the organisation's financial success and knowledge hiding (Table 3). Thus, H4 was positively verified and it was additionally noticed that correlations were more frequent with the rationalised hiding dimension. It can be assumed that in a competitive environment, attitudes typical of *homo oeconomicus* become established, which requires greater rationalisation of an individual's actions.

**Table 3.**

*Observed correlations between the assessment of a given enterprise's success in relation to its competition and the dimensions of knowledge hiding*

|   | EH1     | EH2    | EH3 | EH4     | PD1     | PD2     | PD3     | PD4 | RH1     | RH2     | RH3     | RH4     |
|---|---------|--------|-----|---------|---------|---------|---------|-----|---------|---------|---------|---------|
| Larger market share than the competition                |         |        |     |         | .216855 |         |         |     |         | .229007 |         |         |
| Incurring lower costs than the competition              |         |        |     |         |         |         |         |     | .205798 |         |         |         |
| Increase in revenue compared to the previous year       |         |        |     | .212044 | .25013  | .206751 |         |     | .221981 | .239997 | .228594 | .218624 |
| Increase in capital value compared to the previous year |         | .20119 |     |         |         | .242612 | .213254 |     |         | .206853 | .196257 |         |
| Increase in assets compared to the previous year        | .210489 |        |     |         |         |         |         |     |         |         |         |         |

Note. The table shows Spearman's rank correlation coefficient values only for situations where there was a statistically significant correlation between the variables for  $p < 0.05$ .  $N = 106$ .

Source: own elaboration.

## 5. Discussion

Earlier studies suggested that knowledge hiding was accompanied by stress associated with the fear of, e.g. exposing the management's lack of knowledge. Disappointment, frustration and anxiety were indicated as emotions contributing to knowledge hiding by individuals (Khan et al., 2024; L. Wang et al., 2024b). In the presented study, the emotion that correlated most strongly with the different dimensions of knowledge hiding was frustration, especially in the case of remote work. A significant statistical correlation was also noticed between knowledge hiding and discouragement. Anxiety, however, was not the accompanying emotion in that case. The statistical correlation does not necessarily mean that frustration and discouragement are the emotions that influence reluctance to share knowledge, as they may be the result of individuals making decisions to hide knowledge. However, it should be assumed, as in the research on other factors (Han et al., 2024), that a response may occur here - the occurrence of such emotions may reinforce attitudes of being reluctant to share information with co-workers.

Factors that are ambiguously associated with knowledge hiding are creativity and innovation. According to some authors, knowledge hiding contributes to their weakening (Holten et al., 2016; Kurniawanti et al., 2023), according to others, innovation may weaken with the tendency of continuous knowledge sharing among employees (Yao et al., 2023). The presented study indicates that innovation positively correlates with the tendency to hide knowledge in almost every case. The questions asked to the respondents did not refer to their self-assessment in terms of innovation activities but to the perception of expectations within the

organisation and the actions of the organisation and the management undertaken to increase innovation. Employees' self-assessment could have been far from objective in this respect, due to the tendency of people to evaluate themselves positively. However, the evaluation of expectations could have been assessed as pressure to act innovatively, which does not necessarily involve acceptance of such an attitude.

The competitive atmosphere and sense of economic success of an organisation were also factors associated with knowledge hiding. The results are similar to those obtained in previous research, where it was noticed that employees hid more knowledge in the high market pricing climate. In the studies, market pricing relational climate was defined as that characterised by rational calculation of cost-benefit analyses, as well as comparison of profit and loss (Batistič, Poell, 2022). Thus, in addition to the pressure for individuals to be innovative and - consequently - more efficient, the general competitive atmosphere also favours knowledge hiding.

## **6. Summary**

The conducted study has identified factors that may contribute to knowledge hiding in enterprises. It confirmed previous research findings regarding the statistical correlation between knowledge hiding and innovation and the competitive atmosphere in the organisation. Due to the fact that previous studies did not focus on emotions as a factor that could influence knowledge hiding, that variable was also taken into account. It was assumed that anxiety, discouragement and frustration could have a positive impact on the discussed phenomenon. However, no statistical correlation was confirmed between the sense of fear in relations with co-workers and knowledge hiding, while such a correlation existed between knowledge hiding and frustration.

Even though the research was conducted among 575 employees, less than 20% of them admitted to even occasional knowledge hiding. For that reason, the correlation coefficient values may be low. Research on a larger sample could make it possible to capture stronger statistical correlations and build appropriate models.

## References

1. Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), pp. 99-120. DOI: 10.1177/014920639101700108
2. Batistič, S., Poell, R.F. (2022). Do HR systems and relational climates affect knowledge hiding? An experiment and two-source multi-level study. *Journal of Business Research*, 147, pp. 82-96. DOI: 10.1016/j.jbusres.2022.04.016
3. Butt, A.S. (2019). Consequences of top-down knowledge hiding in firms: A pilot study. *Heliyon*, 5(12). DOI: 10.1016/j.heliyon.2019.e03000
4. Castaneda, D.I., Cuellar, S. (2020). Knowledge sharing and innovation: A systematic review. *Knowledge and Process Management*, 27(3), pp. 159-173. DOI: 10.1002/kpm.1637
5. Connelly, C.E., Zweig, D., Webster, J., Trougakos, J.P. (2012). Knowledge hiding in organizations. *Journal of Organizational Behavior*, 33(1), pp. 64-88. DOI: 10.1002/job.737
6. Delery, J.E., Roumpi, D. (2017). Strategic human resource management, human capital and competitive advantage: Is the field going in circles? *Human Resource Management Journal*, 27(1), pp. 1-21. DOI: 10.1111/1748-8583.12137
7. Farooq, R., Sultana, A. (2021). Abusive supervision and its relationship with knowledge hiding: The mediating role of distrust. *International Journal of Innovation Science*, 13(5), pp. 709-731. DOI: 10.1108/IJIS-08-2020-0121
8. Foss, N.J., Minbaeva, D.B., Pedersen, T., Reinholt, M. (2009). Encouraging knowledge sharing among employees: How job design matters. *Human Resource Management*, 48(6), pp. 871-893. DOI: 10.1002/hrm.20320
9. Gonçalves, T., Curado, C., Oliveira, M. (2023). Clarifying knowledge withholding: A systematic literature review and future research agenda. *Journal of Business Research*, 157. DOI: 10.1016/j.jbusres.2022.113600
10. Hameed, A.A., Anwar, F.A., Waqas, M., Umar, M. (2020). Effect of knowledge hiding on employees creativity. *Paradigms, SI(1)*, pp. 144-151, DOI: 10.24312/20000121
11. Han, R., Tunnisa, A., Ghayas, S., Shahab, M. (2024). Relationship between workplace ostracism and knowledge hiding; mediational role of reciprocity beliefs among college teachers. *Heliyon*, 10(8), e29134. DOI: 10.1016/j.heliyon.2024.e29134
12. Holten, A.-L., Robert Hancock, G., Persson, R., Marie Hansen, Å., Høgh, A. (2016). Knowledge hoarding: Antecedent or consequent of negative acts? The mediating role of trust and justice. *Journal of Knowledge Management*, 20(2), pp. 215-229. DOI: 10.1108/JKM-06-2015-0222
13. Karim, D.N. (2022). Linking dark triad traits, psychological entitlement, and knowledge hiding behavior. *Heliyon*, 8(7). DOI: 10.1016/j.heliyon.2022.e09815

14. Khan, J., Zhang, Q., Saeed, I., Ali, A., Fayaz, M. (2024). Unveiling the nexus between perceived overqualification and knowledge hiding: Moderated mediation analysis of job crafting and job boredom. *Heliyon*, 10(10), e31701. DOI: 10.1016/j.heliyon.2024.e31701
15. Khoreva, V., Wechtler, H. (2020). Exploring the consequences of knowledge hiding: An agency theory perspective. *Journal of Managerial Psychology*, 35(2), pp. 71-84. DOI: 10.1108/JMP-11-2018-0514
16. Kurniawanti, I.A., Zain, D., Thoyib, A., Rahayu, M. (2023). Knowledge hiding and individual task performance: The role of individual creativity as mediator. *Heliyon*, 9(11), e21035. DOI: 10.1016/j.heliyon.2023.e21035
17. Mahmood, H., Rehman, A.U., Sabir, I., Rauf, A., Afthanorhan, A., Nawal, A. (2023). Does organizational justice facet matters in knowledge hiding? *Heliyon*, 9(8), e18372. DOI: 10.1016/j.heliyon.2023.e18372
18. Pan, W., Zhang, Q., Teo, T.S.H., Lim, V.K.G. (2018). The dark triad and knowledge hiding. *International Journal of Information Management*, 42, pp. 36-48. DOI: 10.1016/j.ijinfomgt.2018.05.008
19. Pan, W., Zhou, Y., Zhang, Q. (2016). Does Darker Hide More Knowledge? The Relationship between Machiavellianism and Knowledge Hiding. *International Journal of Security and Its Applications*, 10(11), pp. 281-292. DOI: 10.14257/ijisia.2016.10.11.23
20. Wang, L., Bari, M.W., Shaheen, S., Zhong, K. (2024b). Impostor leader and knowledge hiding: Attachment avoidance as underlying mechanism. *Acta Psychologica*, 244, 104188. DOI: 10.1016/j.actpsy.2024.104188
21. Wang, Y., Bari, M.W., Shaheen, S., Liu, X. (2024a). Dark triad and knowledge hiding in firms: Mediating role of perceived organizational politics. *Acta Psychologica*, 248, 104339. DOI: 10.1016/j.actpsy.2024.104339
22. Westlund, H. (2006). *Social capital in the knowledge economy: theory and empirics*. New York: Springer.
23. Yang, Y.-K., Lin, W.-S. (2023). How to enhance workplace climate through telework communication approaches in organization during the era of changes? Evidences of authentic leaders. *Asia Pacific Management Review*, 28(2), pp. 110-119. DOI: 10.1016/j.apmrv.2022.07.002
24. Yao, G., Zhao, H., Hu, Y., Zheng, X. (2023). Exploring knowledge sharing and hiding on employees' creative behaviors: A coopetition perspective. *Journal of Innovation & Knowledge*, 8(4), 100447. DOI: 10.1016/j.jik.2023.100447
25. Zhang, Z., Takahashi, Y. (2024). How and when team-member exchange influences knowledge hiding behaviors: A moderated dual-pathway model. *Heliyon*, 10(7), e28373. DOI: 10.1016/j.heliyon.2024.e28373



## VIRTUAL LEADER: CAN AI TAKE OVER THE LEADERSHIP ROLE IN MODERN ORGANIZATIONS?

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**Purpose:** The purpose of the study is to assess the potential for artificial intelligence (AI) to replace human leaders in organizations. The study focuses on analyzing employee confidence in AI leaders and identifying areas where AI can be most effective, as well as those where it faces limitations.

**Design/methodology/approach:** The survey was conducted using a survey questionnaire based on a five-point Likert scale, targeting employees from different levels in 168 organizations, mainly in the manufacturing sector. The organizations were divided into four groups according to the number of employees, which allowed for a differentiated analysis of the results. The questionnaire consisted of two parts: a metric and an actual part, in which employees assessed the potential for replacing leadership with artificial Intelligence.

**Findings:** The survey results indicate that AI is increasingly seen as an effective leadership support tool, especially in areas that require quick decision-making and data analysis. Small and medium-sized organizations show greater willingness to entrust AI with leadership roles in operational tasks, while larger companies show skepticism, especially in the context of human relationship management and long-term leadership. AI is valued for its objectivity and elimination of human bias in decision-making processes, but faces limitations in areas requiring empathy and interpersonal skills.

**Research limitations/implications:** The main limitation of the study stems from the fact that the sample consisted mainly of organizations in the manufacturing sector, which may affect the generalizability of the results to other sectors of the economy. In addition, the study was based on a survey method, which may not fully reflect the complexity and dynamics of leadership interactions in practice. Research implications point to the need for further studies on the replacement of leadership with artificial intelligence, particularly in the areas of managing teams and building long-term trust.

**Originality/value:** The original value of this study is the in-depth analysis of trust in AI as a leader and its potential for leadership roles. The study provides unique insights into the varying perceptions of AI by organizations of all sizes, and opens up new avenues of research on the integration of AI in leadership roles.

**Keywords:** Industry 4.0, Leadership, Organizational leadership, Management, Artificial Intelligence, Virtual Leadership.

**Category of the paper:** Research paper.

## 1. Introduction

Dynamic technological development, particularly in the area of artificial intelligence (AI), has led to significant changes in the way organizations are managed. The concept of Leadership 4.0, emerging in the context of the fourth industrial revolution, has introduced a new perspective on the role of technology in leadership (Venkatesh, 2020; Molino et al., 2021). Increasingly, organizational leaders are being supported by digital tools that help them make better, data-driven decisions, increase employee engagement, and foster innovation (Wolański, Węglińska, 2016; Korzyński, 2018).

With the growing presence of AI in organizational structures, questions are being raised about the future of traditional leadership. AI not only supports operational decision-making processes, but also influences human resource management strategies, improves the efficiency of recruitment processes, and supports employee development through personalized recommendations (Nalepka, Bąk, 2017; Walusiak-Skorupa et al., 2023; Chodkowski et al., 2024). However, the full replacement of human leadership by AI raises serious challenges, especially in areas that require interpersonal skills, such as motivating employees and building trust in teams (Jagielska, 2017).

Despite the rapid development of AI and its increasing use in management processes, there are still significant doubts about whether artificial intelligence can completely take over the leadership function, especially in the long-term context of managing teams (Cox et al., 2019; De Cremer, Kasparov, 2021). The traditional leader not only makes operational decisions, but also plays a key role in building relationships with employees, developing their skills, and shaping the organizational culture (Sułkowski, 2001; Żukowski, 2022). AI although a powerful analytical tool, may face limitations in those aspects that rely on intuition, empathy and understanding of human emotions (Strzelecki, 2023; Skorupka, 2024).

Against the backdrop of these challenges, the purpose of this paper is to analyze whether and to what extent AI can actually replace the human leader in organizations. The research conducted aims to examine employees' level of trust in AI leaders, their willingness to work under artificial intelligence leadership, and assess where AI can prove most effective as a leader. In addition, the study identifies potential gaps and limitations in AI's ability to serve as a leader, especially in the context of managing interpersonal relationships in organizations of different sizes and structures.

The research gap that this study attempts to fill relates to the paucity of studies assessing AI's ability to fully replace traditional leadership. While many works focus on AI's supportive role in operational and strategic management, there is a lack of in-depth research on its ability to take over the entirety of a leader's responsibilities, particularly in areas requiring interpersonal competence. This thesis seeks to fill this gap by offering a unique perspective on AI's potential as a future leader of an organization, including the challenges of its large-scale implementation.

## 2. Leadership concepts in the age of artificial intelligence

Dynamic technological changes have led to the concept of Leadership 4.0, which emerged in the context of the fourth industrial revolution, characterized by the intensive development of digital technologies, automation and sustainable development (Oberer, Erkollar, 2018). Modern leadership requires leaders not only to have management skills, but also to be adaptable in a dynamically changing environment. A key aspect of leadership 4.0 is sustainable leadership, which integrates economic goals with social and environmental responsibility (Grzesik, 2023; Pietrzak, 2024).

With the rapid development of technology, artificial intelligence has begun to be increasingly recognized as a transformative force in leadership across sectors, improving decision-making processes, increasing employee engagement and fostering a culture of innovation (Weiland, Wierzbowski, 2021; Juchnowicz, Wolińska-Skuza, 2021; Chodkowski et al., 2024). Integrating artificial intelligence into leadership practices not only streamlines operations, but also enables leaders to make more informed, data-driven decisions, thereby increasing organizational effectiveness (Karakose, Tulubas, 2024; Pawar, Dhupal, 2024). The shift toward data-driven decision-making is critical in today's fast-changing business environment, where the ability to respond quickly to changing conditions is paramount (Brock, Wangenheim, 2019). Moreover, the use of artificial intelligence based on relevant data can help leaders identify potential threats and opportunities, improving strategic planning (Dey et al., 2024).

Artificial intelligence is also being used to increase employee engagement and productivity, supporting talent management by streamlining recruitment processes, providing personalized training recommendations and facilitating employee development (Wolniak, 2016; Rozman et al., 2022; Bankins et al., 2022). For example, artificial intelligence systems can analyze employee performance data to identify skills gaps and suggest targeted training programs, thus supporting a culture of continuous learning (Rozman et al., 2022). This not only improves individual performance, but also contributes to higher overall organizational efficiency (Sposato, 2024). In addition, by reducing repetitive tasks through automation, artificial intelligence allows employees to focus on more meaningful work, which can lead to increased job satisfaction and engagement (Huang, Rust, 2018; Tyson, Zysman, 2022).

The leadership style adopted by executives significantly affects the successful implementation of artificial intelligence initiatives (Gracel, Makowiec, 2017; Rudnicka, 2020). Effective leaders must cultivate a supportive organizational culture that embraces technological change and encourages collaboration between people and AI agents (Bankin et al., 2023; Effendi, Pribadi, 2021). This includes not only providing the necessary resources and training for employees to adapt to artificial intelligence technology, but also fostering an environment where ethical considerations are prioritized in the implementation of artificial intelligence

(Douglas, 2024). Leaders who adopt a coaching approach can alleviate the stress of technological transformation, thereby improving employee well-being and productivity (Jeong et al., 2024).

Fostering leadership through the use of artificial intelligence presents both significant challenges and opportunities.

One of the main challenges of artificial intelligence in leadership is the ethical implications of its use (Sempryk, 2023). Ethical leadership is crucial in guiding an organization through artificial intelligence dilemmas, such as algorithm bias and privacy concerns (Palacz, 2023; Hutson et al., 2023). Leaders must establish ethical standards and foster a culture of accountability around artificial intelligence technology to mitigate these problems (Uddin, 2023). The potential for artificial intelligence to replace traditional leadership roles raises questions about the future of human leadership. While artificial intelligence can improve decision-making with data-driven insights, the essence of leadership in the form of motivation remains a matter of debate (Quaquebeke, Gerpott, 2023).

### 3. Methods

Despite the many benefits of integrating artificial intelligence with leadership, it remains an open question whether AI can fully replace the traditional leader in an organization. While AI improves decision-making and operational processes, its ability to motivate, inspire and build trust within teams remains a challenge. Thus, in the context of AI's growing role in management, there is a research gap regarding the possibility of creating the concept of a virtual leader, where AI, rather than a human, would fully perform the function of an organizational leader.

Based on the research gap, the main research objective was defined, which is to assess whether artificial intelligence (AI) can fully replace traditional leaders in organizations. In order to deeply analyze and verify the stated research objective, the research question “Do employees show trust in AI-based leaders in the context of long-term team management?” was formulated. The article defines the hypothesis: Artificial intelligence can replace the leader in organizations.

In order to find an answer to the research question, a survey was conducted using a questionnaire based on a five-point Likert scale on a sample of 8147 employees from the manufacturing sector. The questionnaire was aimed at purposively selected employees who are at different job levels in the organization, which enabled the deliberate selection of respondents who met the relevant criteria, such as:

- Minimum length of service - 3 months.
- Affiliation with organizations in the manufacturing sector.
- The age of majority of respondents.

Based on the established criteria and the return of completed questionnaires, this made it possible to collect 168 correctly completed questionnaires.

The survey questionnaire consists of two parts: a metric to collect basic information about the respondents, and the actual part, which includes closed questions based on a five-point Likert scale. These questions are designed to explore how respondents perceive the possibility of artificial intelligence performing leadership functions in organizations.

The survey has some limitations that should be taken into account when interpreting the results. The sample is limited to Polish employees in the manufacturing sector, which may affect the possibility of generalizing the results to other countries and industries.

## 4. Results

The survey included an analysis of responses from 168 respondents from four groups of organizations, varying in size (Mościbrodzka, 2018):

- Micro - employing up to 10 people.
- Small - employing 11-50 people.
- Medium - employing 51-249 people.
- Large - employing more than 250 people.

The survey was designed to assess the potential for artificial intelligence (AI) to replace human leadership in various organizations, broken down by staff size. Respondents rated AI's potential competencies in key leadership areas, such as decision-making, team management and trust-building. A five-point Likert scale was used, with a score of 1 indicating complete disagreement with a statement, and 5 indicating full confidence in AI's capabilities in these aspects. Table 1 shows the distribution of respondents' answers by organization size.

**Table 1.**

*Distribution of respondents' answers by organization size.*

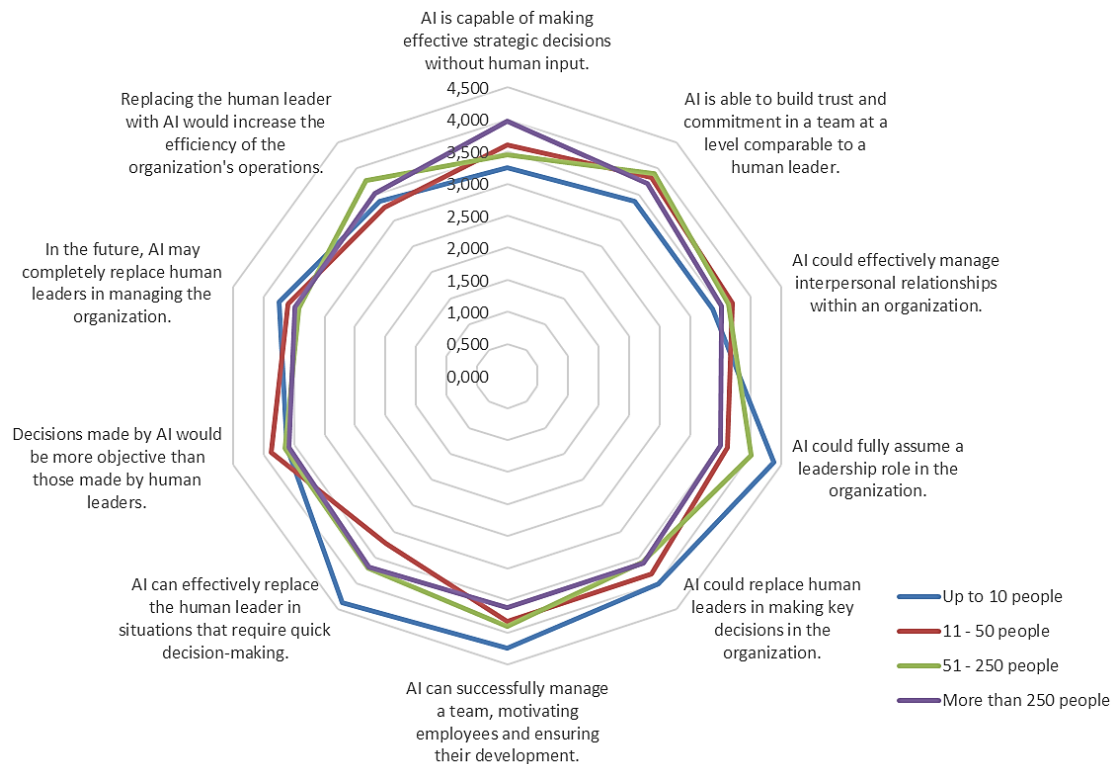
| Attribute   | Variable | Up to 10 people | 11-50 people | 51-250 people | More than 250 people |
|---|----------|-----------------|--------------|---------------|----------------------|
| AI is capable of making effective strategic decisions without human input.                  | 1        | 1               | 2            | 8             | 1                    |
|   | 2        | 0               | 2            | 2             | 10                   |
|   | 3        | 4               | 4            | 13            | 10                   |
|   | 4        | 2               | 10           | 21            | 30                   |
|   | 5        | 1               | 5            | 11            | 31                   |
| AI is able to build trust and commitment in a team at a level comparable to a human leader. | 1        | 0               | 2            | 3             | 5                    |
|   | 2        | 2               | 0            | 4             | 7                    |
|   | 3        | 1               | 5            | 10            | 19                   |
|   | 4        | 5               | 9            | 16            | 26                   |
|   | 5        | 0               | 7            | 22            | 25                   |

Cont. table 1.

|  |   |   |    |    |    |
|--|---|---|----|----|----|
| AI could effectively manage interpersonal relationships within an organization.                    | 1 | 1 | 0  | 4  | 7  |
|  | 2 | 0 | 4  | 3  | 10 |
|  | 3 | 3 | 4  | 16 | 20 |
|  | 4 | 3 | 10 | 18 | 23 |
|  | 5 | 1 | 5  | 14 | 22 |
| AI could fully assume a leadership role in the organization.                                       | 1 | 0 | 2  | 0  | 6  |
|  | 2 | 0 | 2  | 3  | 12 |
|  | 3 | 2 | 5  | 12 | 20 |
|  | 4 | 1 | 8  | 22 | 23 |
|  | 5 | 5 | 6  | 18 | 21 |
| AI could replace human leaders in making key decisions in the organization.                        | 1 | 0 | 0  | 2  | 6  |
|  | 2 | 0 | 5  | 11 | 9  |
|  | 3 | 3 | 2  | 8  | 16 |
|  | 4 | 2 | 8  | 21 | 31 |
|  | 5 | 3 | 8  | 13 | 20 |
| AI can successfully manage a team, motivating employees and ensuring their development.            | 1 | 1 | 1  | 0  | 4  |
|  | 2 | 0 | 0  | 3  | 8  |
|  | 3 | 0 | 6  | 12 | 22 |
|  | 4 | 2 | 11 | 27 | 30 |
|  | 5 | 5 | 5  | 13 | 18 |
| AI can effectively replace the human leader in situations that require quick decision-making.      | 1 | 0 | 3  | 0  | 4  |
|  | 2 | 0 | 3  | 6  | 7  |
|  | 3 | 0 | 7  | 16 | 18 |
|  | 4 | 5 | 6  | 21 | 35 |
|  | 5 | 3 | 4  | 12 | 18 |
| Decisions made by AI would be more objective than those made by human leaders.                     | 1 | 0 | 1  | 2  | 4  |
|  | 2 | 1 | 1  | 5  | 11 |
|  | 3 | 3 | 6  | 15 | 20 |
|  | 4 | 2 | 7  | 21 | 27 |
|  | 5 | 2 | 8  | 12 | 20 |
| In the future, AI may completely replace human leaders in managing the organization.               | 1 | 1 | 1  | 2  | 10 |
|  | 2 | 1 | 2  | 10 | 7  |
|  | 3 | 0 | 6  | 14 | 21 |
|  | 4 | 3 | 10 | 21 | 21 |
|  | 5 | 3 | 4  | 8  | 23 |
| Replacing the human leader with AI would increase the efficiency of the organization's operations. | 1 | 1 | 2  | 1  | 4  |
|  | 2 | 0 | 4  | 5  | 12 |
|  | 3 | 4 | 7  | 12 | 21 |
|  | 4 | 1 | 6  | 25 | 28 |
|  | 5 | 2 | 4  | 12 | 17 |

Source: Own elaboration.

Analyzing the average responses of respondents, a radar chart was developed (Figure 1), which shows the averaged ratings of respondents in the context of assessing the possibility of artificial intelligence replacing the human leader.



**Figure 1.** Assessing the feasibility of replacing human leadership with artificial intelligence.

Source: Own elaboration.

The results presented in the table show the varying attitudes of organizations with different numbers of employees toward the role of artificial intelligence (AI) as a potential leader. The data, based on a Likert scale, show significant differences in perceptions of AI's ability to take on leadership roles depending on the size of the organization.

### Organizations employing up to 10 people

For the smallest organizations (up to 10 employees), the highest score was given to the statement AI can effectively replace the human leader in situations that require quick decision-making, which received a score of 4.375. This suggests that in small organizations AI is particularly valued for its ability to make quick decisions, which may be due to the more dynamic and less complex organizational structure. A similarly high score was given to the statement AI could fully assume a leadership role in the organization (4.375), further confirming the willingness of small teams to give AI a leadership role. On the other hand, the lowest score of 3.250 was given to the statement AI is capable of making effective strategic decisions without human input. This result suggests that small organizations are more skeptical of AI's ability to autonomously make strategic decisions, which may require more complex analysis and long-term thinking.

**Organizations with 11 to 50 employees**

In mid-sized organizations (11-50 employees), the highest score of 3.870 was given to the statement Decisions made by AI would be more objective than those made by human leaders. This score indicates that in this group, AI's ability to make decisions objectively is particularly valued, which can be seen as an advantage over human leaders.

The lowest score in this group was given to the statement AI can effectively replace the human leader in situations that require quick decision-making, with a score of 3.217. This may indicate that organizations of this size are concerned that AI will not be agile enough in dynamic situations where immediate reactions and decisions are required.

**Organizations with 51 to 250 employees**

In organizations with 51 to 250 employees, the highest ratings were given to the statement AI could fully assume a leadership role in the organization (4,000), suggesting that companies of this size are open to the possibility that AI will fully assume a leadership role. Similarly high ratings were given to the statements AI is able to build trust and commitment in a team and AI can successfully manage a team (3.909 each), indicating that AI is seen as effective in managing teams and building trust.

The lowest rating (3.418) was given to the statement In the future, AI may completely replace human leaders in managing the organization, indicating some skepticism about AI fully replacing human leadership. However, AI is rated positively in the context of quick decision-making (AI can effectively replace the human leader in situations that require quick decision-making - 3.709) and increasing the operational efficiency of the organization (Replacing the human leader with AI would increase the efficiency of the organization's operations - 3.764).

**Organizations employing more than 250 people**

The results for organizations with more than 250 employees show that AI is seen as very effective in making strategic decisions without human input, as reflected in the highest rating for the statement AI is capable of making effective strategic decisions without human input (3.976). These organizations appear to see AI's potential in more analytical and objective tasks, such as quick decision-making (AI can effectively replace the human leader in situations that require quick decision-making - 3.683) and in replacing human leaders in making key decisions (AI could replace human leaders in making key decisions in the organization - 3.610). High scores in these areas suggest that AI can play an important role in decision-making at higher organizational levels.

On the other hand, the lowest ratings refer to the full replacement of human leaders in the future. The statement In the future, AI may completely replace human leaders in managing the organization received a score of 3.488, suggesting that despite the acceptance of AI in decision-making issues, there is still skepticism about its role in managing people and fully taking over leadership functions. The relatively low scores for the statement AI could effectively manage interpersonal relationships within an organization (3.524) confirm that AI is still perceived as limited in managing interpersonal relationships, which can be crucial in larger organizations.



## 5. Conclusion

A study was conducted to assess whether artificial intelligence (AI) can completely replace the human leader in organizations, taking into account such key aspects as decision-making, team management and trust building. The results show a clear increase in the acceptance of AI as a tool to support leaders, especially in tasks that require rapid response and data analysis. In small and medium-sized organizations, AI was seen as capable of taking over some of the leader's responsibilities, especially for operational and tactical decisions that can be made based on available data.

Studies have shown that AI is particularly valued for its ability to make decisions objectively and eliminate human bias and emotional influences. In organizations that rely on a fast-paced environment, AI can support leaders by reducing reaction times and improving the accuracy of decisions. Small organizations with less complex structures were more likely to accept AI in a leadership role, due to the simplicity of decision-making processes and greater flexibility.

The research also highlighted AI's serious limitations in terms of replacing human leadership to its full extent. The biggest challenge remains AI's ability to manage interpersonal relationships, build trust in teams and inspire employees. These aspects are key to effective leadership, and currently AI-based technologies are unable to fully reflect the empathy, intuition and emotional understanding that characterize human leaders. In areas where interpersonal communication and motivating teams are required, AI still has significant shortcomings.

In larger organizations that operate in more complex structures and require long-term strategy and advanced personnel management, AI is seen as a support tool rather than an autonomous leader. Although AI can significantly improve operational efficiency by supporting decision-making processes, employees in these organizations express some skepticism about its ability to fully replace traditional leaders. This is primarily due to the fact that leadership in large companies requires not only technical skills, but also the ability to manage emotions, motivate teams and build organizational culture - all of which remain major challenges for artificial intelligence.

The study's findings show that despite technological advances and the increasing use of AI in organizations, its ability to fully assume leadership roles is still limited. The survey also revealed differences in perceptions of AI depending on the size of the organization. Smaller companies are more open to the idea of AI-based autonomous leadership, while larger organizations, due to their complexity, still see AI more as a support for leaders than a full-fledged leader.

## 6. Summary

The goal of the study was to understand whether artificial intelligence (AI) is capable of replacing human leadership in organizations, as well as what employees' perspectives are on trusting AI leaders to manage teams over the long term. The analysis included 168 organizations of varying sizes to compare perceptions of AI's ability to take on key leadership roles, such as decision-making, team management and trust-building.

In small organizations with up to 10 employees, AI was highly rated in terms of rapid decision-making. Employees at these companies saw AI's potential to fully assume leadership roles, which may be due to the lower complexity of decision-making and the more dynamic nature of management. AI was particularly valued for its effectiveness in making immediate decisions in situations that required quick responses. However, these organizations were skeptical of AI's ability to make strategic decisions on its own, which require more complex thinking and long-term vision.

Medium-sized organizations (11-50 employees) valued AI for its objectivity in decision-making, which was considered an advantage over human leaders. Especially in the areas of eliminating bias and making fair decisions, AI was seen as a tool to improve management processes. However, organizations of this size were more critical of AI's ability to effectively manage dynamic situations, which may be related to the greater complexity of internal structures and the need to quickly adapt to changing conditions.

In larger organizations with 51 to 250 employees, AI was rated positively in terms of its ability to manage teams and build trust within a group of employees. Employees in these organizations expressed the belief that AI could effectively support management processes by making more objective decisions and eliminating emotional factors affecting leadership. AI was also regarded as a tool that could increase operational efficiency, which is crucial for organizations with larger workforces. However, despite the positive assessment of AI's role in tactical decisions, respondents expressed some skepticism about AI's ability to completely replace human leadership, especially in the context of long-term management and relationship building.

The largest organizations, those with more than 250 employees, saw great potential for AI in making strategic decisions without human involvement. AI was particularly highly regarded in the context of analysis and data-driven decisions that require precision and objectivity. In larger organizational structures, where decision-making processes are more complex, AI could effectively support leaders in making faster and more accurate decisions. However, even in these organizations, respondents expressed doubts about AI's ability to completely replace human leaders, especially in areas that require managing interpersonal relationships, building commitment and motivating teams.

The survey results show that AI is seen as a valuable tool to support decision-making and operational processes, especially in areas that require rapid data analysis and decision-making. However, its role as a full-fledged organizational leader, especially in the context of human relationship management, remains under discussion. Skepticism among employees, especially in larger organizations, indicates that despite technological advances, fully autonomous AI leadership still raises questions and challenges, especially in areas related to motivating employees and building trust.

The results largely confirmed the hypothesis - AI can replace leadership in organizations, but it has serious limitations in performing leadership functions in areas requiring complex interpersonal skills. In particular, there is still skepticism in larger organizations about AI fully replacing human leaders.

The original value of this study is the analysis of trust in AI as a leader in the context of diverse organizations, which brings a new perspective to the discussion of integrating artificial intelligence into management structures. The research has provided new insights into the potential of artificial intelligence (AI) to play a leadership role in organizations. The findings show that AI is most effective in tasks that require quick decision-making and data analysis. Small and medium-sized organizations show more openness to entrusting AI with leadership roles in operational tasks, while larger organizations are more skeptical, especially in the context of managing interpersonal relationships and building trust. Nevertheless, the study encountered some limitations, such as focusing mainly on organizations in the manufacturing sector, which may limit the generalizability of the results to other economic sectors. In addition, the study relied on surveys, which may not fully capture the dynamics of leadership relationships in practice.

Future research assumes a focus on organizations across sectors to explore how AI can play a leadership role in more diverse contexts, as well as a deeper analysis of AI's impact on long-term team management and organizational culture building. This article can inspire future research in the context of replacing human leadership with AI and its ability to effectively motivate and manage teams long-term in the context of different industries and organizational structures.

## References

1. Bankins, S., Formosa, P., Griep, Y., Richards, D. (2022). AI decision making with dignity? Contrasting workers' justice perceptions of human and AI decision making in a human resource management context. *Information Systems Frontiers*, 24(3), 857-875.
2. Bankins, S., Ocampo, A.C., Marrone, M., Restubog, S.L.D., Woo, S.E. (2024). A multilevel review of artificial intelligence in organizations: Implications for organizational behavior research and practice. *Journal of Organizational Behavior*, 45(2), 159-182.
3. Brock, J.K., Wangenheim, F.(2019). Demystifying ai: what digital transformation leaders can teach you about realistic artificial intelligence. *California Management Review*, 61(4), 110-134.
4. Chodkowski, M., Karniewicz, T., Liksza, J. (2024). *Digital HR. Czy AI to nasza przyszłość? Virtualo*.
5. Cox, A.M., Pinfield, S., Rutter, S. (2019). The intelligent library: Thought leaders' views on the likely impact of artificial intelligence on academic libraries. *Library Hi Tech*, 37(3), 418-435.
6. De Cremer, D., Kasparov, G. (2021). AI should augment human intelligence, not replace it. *Harvard Business Review*, 18(1).
7. Dey, P.K., Chowdhury, S., Abadie, A., Vann Yaroson, E., Sarkar, S. (2024). Artificial intelligence-driven supply chain resilience in Vietnamese manufacturing small-and medium-sized enterprises. *International Journal of Production Research*, 62(15), 5417-5456.
8. Douglas, D.D. (2024). *Responsibilities of an Executive Leading AI Projects: Navigating Federal Directives for Safe and Inclusive Development*.
9. Effendi, G.N., Pribadi, U. (2021, March). The Effect of Leadership Style on the Implementation of Artificial Intelligence in Government Services. *IOP Conference Series: Earth and Environmental Science*, Vol. 717, No. 1, p. 012018. IOP Publishing.
10. Gracel, J., Makowiec, M. (2017). Kluczowe kompetencje menedżera w dobie czwartej rewolucji przemysłowej–Przemysłu 4.0. *Acta Universitatis Nicolai Copernici. Zarządzanie*, 44(4), 105-129.
11. Grzesik, K. (2023). Przywództwo w kontekście zrównoważonego rozwoju przedsiębiorstwa. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 67(4), 74-82.
12. Huang, M.H., Rust, R.T. (2018). Artificial intelligence in service. *Journal of service research*, 21(2), 155-172.
13. Hutson, J., Coble, K., Kshetri, N., Smith, A. (2023). Exploring the intersection of digital marketing and retail: Challenges and opportunities in AI, privacy, and customer experience. *Confronting Security and Privacy Challenges in Digital Marketing*, 50-72.

14. Jagielska, M. (2017). Sztuczna inteligencja w zarządzaniu—stan aktualny a perspektywy. *Przedsiębiorczość i Zarządzanie*, 18(2.2), 95-104.
15. Jeong, J., Kim, B.J., Lee, J. (2024). Navigating AI transitions: how coaching leadership buffers against job stress and protects employee physical health. *Frontiers in public health*, 12, 1343932.
16. Juchnowicz, M., Wolińska-Skuza, A. (2021). Warunki stymulujące i ograniczające kreatywność pracowników w zwinnej organizacji. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 65(1), 46-64.
17. Karakose, T., Tülübas, T. (2024). School Leadership and Management in the Age of Artificial Intelligence (AI): Recent Developments and Future Prospects. *Educational Process: International Journal*, 13(1), 7-14.
18. Korzyński, P. (2018). *Przywództwo w erze cyfrowej. Sposoby pokonywania ograniczeń na platformach społecznościowych*. Poltext.
19. Molino, M., Cortese, C.G., Ghislieri, C. (2021). Technology acceptance and leadership 4.0: A quali-quantitative study. *International Journal of Environmental Research and Public Health*, 18(20), 10845.
20. Mościbrodzka, K. (2018). Analiza sytuacji finansowej przedsiębiorstw niefinansowych w Polsce w 2017 roku i pierwszym kwartale 2018 roku na tle lat poprzednich z podkreśleniem roli dużych przedsiębiorstw w gospodarce. *Zeszyty Naukowe Uczelni Vistula*, 63(6), *Ekonomia*, XVII, 44-82.
21. Nalepka, A., Bąk, J. (2017). Implikacje praktyczne koncepcji słabych sygnałów dla zarządzania strategicznego. *Historia i perspektywy nauk o zarządzaniu*, 113.
22. Oberer, B., Erkollar, A. (2018). Leadership 4.0: Digital leaders in the age of industry 4.0. *International journal of organizational leadership*.
23. Palacz, K. (2023). *Jak inteligentne jest prawo regulujące sztuczną inteligencję? Próba analizy AI Act na podstawie jej ugruntowania w przestrzeni komercyjnego użycia*.
24. Pawar, S., Dhupal, V. (2024). The role of technology in transforming leadership management practices. *Multidisciplinary Reviews*, 7(4), 2024066-2024066.
25. Pietrzak, M. (2024). i5—dydaktyka skierowana na rozwój zrównoważonego przywództwa. *Studia i Prace Kolegium Zarządzania i Finansów*, 197, 153-164.
26. Quaquebeke, N.V., Gerpott, F.H. (2023). The now, new, and next of digital leadership: How Artificial Intelligence (AI) will take over and change leadership as we know it. *Journal of Leadership & Organizational Studies*, 30(3), 265-275.
27. Rożman, M., Oreški, D., Tominc, P. (2022). Integrating artificial intelligence into a talent management model to increase the work engagement and performance of enterprises. *Frontiers in psychology*, 13, 1014434.
28. Rudnicka, A., Kaczorowska-Spychalska, D., Kulik, M., Reichel, J. (2020). *Digital ethics—polscy konsumenci wobec wyzwań etycznych związanych z rozwojem technologii. I Ogólnopolski Raport*.

29. Semprzyk, J. (2023). Implikacje etyczne na temat sztucznej inteligencji. *Spoleczeństwo*, 162(2), 69-81.
30. Skorupka, A. (2024). Sztuczna inteligencja zabierze ludziom pracę. *Management & Quality [Zarządzanie i Jakość]*, 6(1).
31. Sposato, M. (2024). Leadership training and development in the age of artificial intelligence. *Development and Learning in Organizations: An International Journal*, 38(4), 4-7.
32. Strzelecki, R. (2023). „Sztuczna inteligencja” a duchowość człowieka.
33. Sułkowski, Ł. (2001). Role przywódcy i kierownika a wzory kierowania. *Acta Universitatis Lodzianensis. Folia Sociologica*, 29, 189-209.
34. Tyson, L.D., Zysman, J. (2022). Automation, AI & work. *Daedalus*, 151(2), 256-271.
35. Uddin, A.S.M. (2023). The Era of AI: upholding ethical leadership. *Open Journal of Leadership*, 12(04), 400-417.
36. Venkatesh, D.A.N. (2020). Leadership 4.0: Leadership strategies for industry 4.0. *Solid State Technology*, 63(6).
37. Walusiak-Skorupa, J., Kaczmarek, P., Wiszniewska, M. (2023). Artificial Intelligence and employee's health—new challenges. *Medycyna Pracy*, 74(3).
38. Weiland, D., Wierzbowski, P. (2021). Sprawność procesów logistyki informacji w obliczu rozwoju sztucznej inteligencji. In: C. Mańkowski, L. Rzeska (Eds.), *Modelowanie procesów i systemów logistycznych* (pp. 259-280). Wydawnictwo Uniwersytetu Gdańskiego.
39. Wolański, M., Węglińska, A. (2016). Świat cyfrowy w kształtowaniu nowego ładu w stosunkach międzynarodowych. *Zeszyty Naukowe Uczelni Jana Wyżykowskiego. Studia z Nauk Społecznych*, 9.
40. Wolniak, R. (2016). Kulturowe aspekty zarządzania jakością. *Etyka biznesu i zrównoważony rozwój*, 110-122.
41. Żukowski, M. (2022). Administracja menedżerów. *Rocznik Administracji Publicznej*, 8, 484-503.

## A CONCEPT OF ORGANISATIONAL RESILIENCE MEASUREMENT AND ASSESSMENT

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**Purpose:** The cognitive aims of the article included (1) a diagnosis to what extent the density of crisis factors has influenced the development of empirical research in the field of operationalising organisational resilience and (2) an assessment of the application capabilities for its measurement methods proposed thus far.

**Design/methodology/approach:** In order to achieve such a formulated objective, a systematic literature review and an analysis of reports from scientific studies were undertaken (extracted from the Scopus and Web of Science database). An in-depth exploration of identified texts structured knowledge on the concepts organisational resilience assessment and measurement, while taking into account time intervals.

**Findings:** All to date's attempts to measure and assess organisational resilience have rather been modest, if not circumscribed, while discrepancies of a conceptual and definitional nature do not facilitate the operationalisation of the concept. In addition, its heterogeneity means that any attempts to quantify organisational resilience involve a number of assumptions. Various authors' concepts for resilience measurement have been proposed in the literature, particularly for organisations in the industries and sectors for which the impact of the pandemic was most severe. However, no standard has been developed in this area, although promises of one were made in a number of pre-2020 scientific papers.

**Practical implications:** The spread and further development of the concept of organisational resilience measurement is largely determined by the level of managerial awareness of the usefulness of such measurement for organisational survival and decision support.

**Originality/value:** The findings present the extent and sophistication of methods for measuring organisational resilience over time. A research using bibliometric techniques made it possible to indicate the stage of development of our research. It can be seen that the academic debate on organisational resilience is resurgent and takes on new dimensions at watershed moments, i.e.: pandemic. The study undertaken extends and organises the knowledge drawn from the literature. In addition, the collected empirical material allowed for a preliminary critical assessment of the application potential of the proposed model solutions.

**Keywords:** organisational resilience, time intervals, measurement.

**Category of the paper:** Literature review.

## 1. Introduction

The observed increasing density of the organisational environment (Chodyński, 2021; Troise et al., 2022), resulting from the overlapping and mutual reinforcement of complex phenomena and changes of a discontinuous nature (climate crises, pandemics or the consequences of warfare), forces companies to take adaptation measures and contributes to the emergence of new management concepts and methods. In response to negative changes in the environment, the concept of organisational resilience is of great interest to representatives of management sciences.

In the application dimension, its development and operationalisation can contribute to enhancing the ability of organisations to cope with risks or to overcome them more quickly. This provides an impetus to undertake large-scale studies of organisational resilience.

The category of resilience has been adapted to the specificities of households (McKnight, Rucci, 2020), non-profit organisations (Searing et al., 2021), non-financial corporations (Samborski, 2022), family businesses (Ingram, 2023; Conz et al., 2020), public sector institutions (Barbera et al., 2017), government (Chang, 2021), business organisations (Granig, Hilgarter, 2020; Grego et al., 2024), supply chains (Hillmann, Guenther, 2021) or groups and task forces (Barton, Kahn, 2019; Pavez et al., 2021). The multifaceted nature of the ongoing scholarly discussion means that the validity of organisational resilience measurement is also recognised, and promises of a solution to this have already emerged in scholarly texts from 2008 through 2013 (Lee et al., 2013). Scherbaum and Meade (2013) emphasise that 'better measurement is the key to better research and theory'. This opens up an interesting field of theoretical and research considerations.

The cognitive aim of the article was to diagnose to what extent the concentration of crisis factors had influenced the development of empirical research in the area of operationalising organisational resilience and to assess the applicability of the methods proposed so far for its measurement. A research using bibliometric techniques made it possible to indicate the stage of development of our research. It can be seen that the academic debate on organisational resilience is resurgent and takes on new dimensions at watershed moments, i.e.: pandemic.

## 2. Theoretical background

Unforeseen and exceptional situations or events that negatively affect the functioning of an organisation are the direct cause of researchers' interest in the issue of organisational resilience (Weick, Roberts, 1993; Weick, 1993). Resilient organisations have the ability to



renew and maintain their competitive advantage, regardless of unfavourable conditions, they are able to build their market position also in the long term (Kozielski, 2022).

Duchek (2020) points out that the resilience concept is relatively new in business and management research, there is also a perceived lack of an overarching theoretical framework of organisational resilience (Duchek, 2020, p. 220), and research is fragmented.

At the same time, the scientific debate on organisational resilience and its measurement is resurgent and takes on new dimensions at turning points, i.e.: economic crisis or pandemic. Also in the business space, the need for solutions and tools to overcome market shocks is reported. A review of the definitions of organisational resilience shows that the concept can be understood in two ways. Passive resilience is the ability to respond to crises, allowing the organisation to recover (Ali, Gölgeci, 2019), to absorb disruptions and shocks (Mitchell, 2013, p. 7). Another view indicates that it is the ability to anticipate unexpected events, in which case we speak of active resilience (Annarelli, Nonino, 2016).

Resilient organisations have the ability to maintain existing core structures and they excel at anticipating, absorbing, and adjusting to changes (Ortiz-de-Mandojana, Bansal, 2016). This capability may manifest itself in the ability to implement appropriate algorithms or predictive mechanisms for recovery (Filimonau et al., 2020) as well as for revival from difficulties (Marcucci et al., 2021).

The cited definitions of organisational resilience indicate the capaciousness and complexity of the concept, as commonly pointed out by researchers. In addition, the matter is complicated by the fact that organisational resilience can be understood as a response to unpredictable events of different nature: economic (Sahebjamnia et al., 2018), ecological (Hillmann, Geunther, 2021), or social (Cruz et al., 2014).

The results of the bibliometric analysis indicate the existence of events that, on one hand, posed a serious threat to the survival of the organisation, while on the other, made an important contribution to the development of research on organisational resilience. It is therefore possible to point out a certain tendency to develop research in this area as a result of the occurrence of negative disruptions, i.e. the economic crisis after 2008, the pandemic in 2020, the growing climate crisis. This makes it all the more pertinent to indicate whether the pandemic conditions of the organisation have contributed to the development of organisational resilience measurement solutions.

Developing an appropriate instrumentation is indicated as a challenge more important than ever before (Ilseven, Puranam, 2021). The prerequisite for the implementation of the issue for the use of business practice is, first of all, the precision and consistency of its definition (Podsakoff et al., 2016), followed by the development of an organisational resilience assessment tool that, on one hand, diagnoses the scale of the potential problem, while on the other, may identify areas that require corrective action.

Sevilla and team (2023) argues that the increased interest in the concept and the attempts being made to measure organisational resilience are driven by an organisation's desire to maximise the likelihood of business continuity. Already before the pandemic, one could see increasing attempts to structure the issue of organisational resilience, identifying characteristics, resources or attributes specific to a resilient organisation (Williams et al., 2017). Of note is the paper by Hillmann & Geunther (2021), which presents a comprehensive review of organisational resilience research. The authors already pointed out in 2021 the need for more clarity in the measurement of organisational resilience. Similar scientific studies of a stock-taking nature (especially those prior to the pandemic) can be seen as a call for a broader interest in the issue of measurement, primarily from an empirical perspective. In the face of a critical event, such as the pandemic undoubtedly was, a legitimate question arises as to whether, in line with the reported demand, the work on standardising organisational resilience measurement tools has been intensified and whether concrete results of this work can be pointed to.

### 3. Method

For the purpose of achieving the formulated objective, a systematic literature review of publications, indexed in the Web of Science (WoS) and Scopus (Sc) electronic databases, was used, with a focus on the post-pandemic period. Numerous advantages of this method are pointed out. The usefulness of a systematic literature review stems primarily from methodological rigour, the elimination of limitations inherent in traditional reviews and the ability to replicate scientific research (Czakoń, 2013), which ultimately affects the objectivity of the research. In recent years, a systematic literature review has become a practical solution to comprehensively analyse different types of research topics (Denyer, Tranfield, 2009).

In a subsequent step, a full-text analysis of articles from the reference database made it possible to structure the knowledge on organisational resilience measurement proposals. The research assumption was to perform an exploratory and verification function (Kuciński, 2014), and the entire procedure is shown in Table 1.

The essential starting point of the research conducted was to identify publications containing the phrase 'organisation\* resilience + measure\*' (differences in the spelling of British English and American English were taken into account). The Web of Science database yielded 2350 and the Scopus database 2869 such records. In subsequent steps, exclusion criteria were identified and applied, as outlined in a systematic literature review (Fink, 2014), the application of which yielded a reference sample of publications. Only studies in the form of articles were classified for further analysis, following Czakoń's (2013, p. 48) argumentation that: 'given the number of articles published in the globalised research community, their annual growth or timeliness vs. book publications, it is the continuing publications that become the vehicle for research development'.

Another filtering criterion was the Scopus subject area: “Business, Management and Accounting” / Web of Science Categories: „Business” and “Management”. Language filtering was also applied, limiting the articles to English-language versions so that they can be subjected to international evaluation and discussion.

**Table 1.**

*Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)*

| Steps in searching for publications   | The number of records |        |
|---|-----------------------|--------|
|   | WoS                   | Scopus |
| 1. Results for “organi?ation* resilience” + “measure*” (status: 2024-07-10)   | 2350                  | 2869   |
| 2. Narrowing to document types: Article (final and open access)   | 1095                  | 1112   |
| 3. Narrowing to:<br>- Web of Science Categories: „Business” and “Management”,<br>- Scopus subject area: “Business, Management and Accounting”                             | 88                    | 116    |
| 4. Narrowing to English language  | 88                    | 110    |
| 5. Total number of records with no duplicates (44)  | 154                   |        |
| Total number of records – the result of abstract contents analysis  | 154                   |        |
| Total number of articles relating to the measurement of organisational resilience (proposals for measurement scales) – the result of full-text article contents analysis. | 16                    |        |

Source: Own elaboration.

In the end, the reference database, after removal of duplicates, comprised 154 records. In subsequent stages (first as a result of the contents analysis of abstracts and then as a result of the contents analysis of full-text articles), the studies treating resilience and its measurement as a side issue were excluded.

## 4. Results

An analysis of the global scientific output in the field of organisational resilience revealed some patterns. Pre-2020 scientific inquiries tend to be qualitative and interdisciplinary, referring, for example, to positive psychology (Avey et al., 2008) or organisational development more broadly. This is confirmed, for example, by Stephenson (2010), who understands organisational resilience not only as the ability to maintain stability, to return to a state of homeostasis, but also to thrive, despite unfavourable conditions.

Initially, authors looked, among other things, at the ability of organisations to self-renew themselves over time through innovation (Reinmoelle, Baardwijk, 2005). Works addressed both the economic, social and environmental aspects of resilience. According to Cimellaro and team (2010), it is the time it takes for an organisation to recover and reach an acceptable level of performance after a disruptive event that can be a measure to ensure that organisational resilience can be compared between organisations.

It is impossible not to agree with Romanowska (2012) that, despite its popularity, the concept has not been operationalised, with researchers limiting themselves to identifying characteristics that shape resilience or using indicators that measure economic health or risk of bankruptcy.

The timing of negative and unpredictable environmental changes, caused by the pandemic, led to a redefinition of the concept of organisational resilience. As shown in Table 2, post-2020 qualitative research still prevails, narrowing the context of consideration to a specific organisation using case studies. However, one can also see attempts to quantify resilience, developing measurement scales or conceptual assumptions in relation to companies in sensitive sectors for which the pandemic was most severe (micro and small enterprises or hotels). The contextualisation or restriction of considerations to a specific industry (Garcia-Perez et al., 2022; Shela et al., 2023) greatly affects the representativeness of the results obtained.

As shown in Table 2, there were also attempts to link organisational resilience to the economic or financial efficiency of companies. Examples include a research by Sajko and co-workers (2020). Organisation surveys and Likert scales are often used, and the measurement of organisational resilience itself is a comparison of the results obtained in the survey with a benchmark, which is usually a previous survey (Sevilla et al., 2023, p. 206). Among others, Pathak and Joshi (2021), using the Likert scale, identified indicators that can be used to improve organisational resilience. In contrast, Ilseven and Puranam (2021) treat organisational resilience measurement as a performance outcome.

**Table 2.**

*Summary of publications dealing with the subject of organisational resilience measurement based on a systematic literature review*

| Year | Author / Title   | Sector / country / context   |
|------|--|--|
| 2024 | Lestari, E.D., Abd Hamid, N., Shamsuddin, R., Kurniasari, F., Yaacob, Z.: Investigating the factors of SMEs' business resilience in the post-pandemic crisis of COVID-19 with technology adoption as a quasi-moderator: a multigroup analysis of Indonesian and Malaysian SMEs | SMEs / Malaysia and Indonesia<br>context: COVID-19<br><br>Type of construct / dimension:<br>a multigroup analysis  |
| 2024 | Rubakha, M., Tkachyk, L., Pryimak, I., Demchyshak, N., Yurkiv, R.: Factor analysis of financial performance and formation of strategic resilience in Ukrainian IT companies under the challenges of war  | IT companies / Ukraine / context: war<br><br>Type of construct / dimension:<br>multifactorial multiplicative model and a factor analysis of the financial performance  |
| 2024 | Korpysa, J., Judit, O.: Startups' organizational resilience in post-COVID times  | Startups / Poland / context: COVID-19<br>Type of construct / dimension:<br>Efficient use of market information,<br>Efficient acquisition of new financial resources,<br>Efficient anticipation of market trends,<br>Efficient implementation of process innovations,<br>Efficient acquisition of new customers,<br>Efficient building of customer loyalty,<br>Efficient change implementation and management,<br>Efficient anticipation of market failures<br>construct: multi-dimensional |

Cont. table 2.

|                          |   |  |
|--------------------------|---|--|
| 2023                     | Liu, X.H., Tse, Y.K., Wang, S.Y., Sun, R.Q.: Unleashing the power of supply chain learning: an empirical investigation  | Operational resilience / supply chain learning<br>Context: China<br>construct: multi-dimensional   |
| 2023                     | Nguyen, H., Pham, A.V., Pham, M.D., Pham, M.H.: Business resilience: Lessons from government responses to the global COVID-19 crisis  | context: COVID-19<br>corporate default risk as a measure of non-resilience   |
| 2021                     | González, A.C., Pérez-Urbe, M.A.: Family business resilience under the COVID-19: A comparative study in the furniture industry in the United States of America and Colombia | office furniture industry / Colombia and the USA<br>context: COVID-19/<br>construct: multi-dimensional   |
| 2021                     | Ilseven, E., Puranam, P.: Measuring organizational resilience as a performance outcome  | divisions, departments and teams or alliances, ecosystems, meta-organizations/<br>measure resilience in terms of changes to organizational performance after unexpected adversity (like Weick, 1993), construct: multi-dimensional                           |
| 2020                     | Conz, E., Lamb, P.W., De Massis, A.: Practicing resilience in family firms: An investigation through phenomenography  | family business / contribution of owners/managers in practicing resilience / phenomenography, an interpretive methodology  |
| 2020                     | Melián-Alzola, L., Fernández-Monroy, M., Hidalgo-Peñate, M.: Hotels in contexts of uncertainty: Measuring organizational resilience   | hotels / the Canary Islands<br>a holistic model to measure organisational resilience, , predictors of resilience (strategy and change), construct: multi-dimensional   |
| 2020                     | Păunescu, C., Mátyus, E.: Resilience measures to dealing with the COVID-19 pandemic. Evidence from Romanian micro and small enterprises                                     | micro and small enterprises / Romania<br>context: COVID-19<br>a questionnaire-based survey / an exploratory factor analysis / construct: multi-dimensional: openness to production innovation and adaptation, a strong support for customers and communities |
| 2020                     | Sajko, M., Boone, C., Buyl, T.: CEO greed, corporate social responsibility, and organizational resilience to systemic shocks  | context: global financial crisis<br>organisational resilience measurement as a performance outcome   |
| <b>pandemic COVID-19</b> |   |  |
| 2018                     | Parker, H., Ameen, K.: The role of resilience capabilities in shaping how firms respond to disruptions  | emerging economy during a period of severe power supply disruptions/<br>short scale of resilience /<br>construct: multi-dimensional  |
| 2016                     | Ortiz-de-Mandojana, N., Bansal, P.: The long-term benefits of organizational resilience through sustainable business practices.   | companies operating on international markets<br>context: sustainability/climate change / ecological resilience / ex-post analysis /<br>construct: one-dimensional - survival   |
| 2012                     | Mafabi, S., Munene, J.C., Ntayi, J.M.: Knowledge management and organisational resilience: Organisational innovation as a mediator in Uganda parastatals.                   | family businesses<br>context: long-term perspective<br>Measurement scale for organizational resilience / one score for organizational resilience construct / multi-dimensional / construct: multi-dimensional  |
| 2008                     | Lee, A.V., Vargo, J.J., Seville, E.: Developing a Tool to Measure and Compare Organizations' Resilience   | Relative Overall Resilience Model -<br>factors: Situation Awareness, Vulnerabilities, Adaptive Capacity / construct: multi-dimensional   |
| 2008                     | McManus, S., Seville, E., Vargo, J., Brunsdon, D.: Facilitated Process for Improving Organizational Resilience  | 10 case study organizations / multi-dimensional<br>a wide range of industry sectors, business types, and sizes in New Zealand / construct: multi-dimensional   |

Source: Own elaboration.

Undoubtedly, the pandemic experience increased researchers' interest in the topic of organisational resilience. However, the diversity and multidimensionality of the proposed measurement metrics and the lack of a developed standard of measurement means that there is still a cognitive deficiency in this area. The existing solutions do not make the business case for investing in resilience, they do not identify areas of strengths and weaknesses for a company to build resilience before a crisis occurs. It is not uncommon for these constructs to be laden with subjectivity, and this is contributed to, for example, by the lack of precise definition of the organisational resilience component variables.

Measures of categories, standing in opposition to organisational resilience, are also proposed, e.g. vulnerability. Resilience can be assessed using objective indicators (e.g. total revenue, the return on capital, sales growth or debt levels) as well as subjective indicators (e.g. customer satisfaction, staff development) (Torres et al., 2019).

An interesting problem is highlighted by Greenham and team (2013) pointing out that interventions that increase gross domestic product can and often do conflict with other factors that build organisational resilience. The potential for conflict between macro and micro approaches, on an application level, adds to the difficulty of measuring and assessing resilience in an integrated way. Research to date has been dominated by a retrospective approach, i.e. organisational resilience is analysed mainly after disruptions have occurred (Linnenluecke, 2017). In contrast, interesting conclusions are provided by the research of Sevilla and team (2023), indicating that 'organisational resilience is a rather adynamic process' and therefore 'it cannot be measured or estimated in an ex-ante way'.

All to date's attempts to measure and assess organisational resilience have rather been modest, if not circumscribed, while discrepancies of a conceptual and definitional nature do not facilitate the operationalisation of the concept. In addition, its heterogeneity means that any attempts to quantify organisational resilience involve a number of assumptions. Various authors' concepts for resilience measurement have been proposed in the literature, particularly for organisations in the industries and sectors for which the impact of the pandemic was most severe.

An analysis of global research shows that attempts to operationalise organisational resilience are relatively scarce. They are limited to describing its qualitative attributes, i.e. employee commitment, leadership, agile decision-making, innovation, internal resources, and a proactive attitude (Stephenson, 2010), as well as the use of measurement scales. There have been notable efforts to adapt Stephenson's (2010) Benchmark Resilience Tool questionnaire for use by companies operating in contexts outside the US, including Poland (Rzegocki, 2021). However, the pandemic did not bring about a significant breakthrough in the development of measurement tools or a universally accepted standard. Several key limitations in measuring organisational resilience can still be identified.

Firstly, as organisational resilience is a theoretical construct, its direct measurement – inherent in the mathematical sciences – is challenging (Dyduch, 2015). Factors contributing to an organisation's resilience include the management of intangible resources, conflict prevention mechanisms, and risk awareness. Developing a single synthetic indicator appears to be unfeasible, which is why a multi-item approach has been used up to this point. Future research should aim to develop a comprehensive measurement of organisational resilience, taking into account the numerous factors that contribute to it.

Secondly, the widespread use of Likert scales to measure organisational resilience often focuses on capturing respondents' opinions, attitudes, or perspectives, making the measurement prone to subjectivity.

Thirdly, the measurement of organisational resilience is highly contextual, limiting the comparability of results, especially in international or cross-sectoral analyses. However, exploring organisational resilience in different contexts also highlights that the concept is widely recognised and valued globally.

Fourthly, a key limitation of the solutions proposed thus far is their retrospective nature, which does not offer a foundation for broader inference or forecasting. The COVID-19 crisis, however, highlights the growing need to develop an early warning system for future risks. Additionally, measuring organisational resilience must account for its dynamic nature, requiring an evaluation of the impact of shocks on the organisation's environment.

In light of these findings, while measuring organisational resilience remains challenging, it is essential to focus on this area, and we can expect growing interest in the topic. Without proper measurement, there is a lack of control and an inability to manage effectively, especially during a time when crises are widespread.

## 5. Summary

Resilience is widely recognised as a desirable attribute for organisations (cf. Hamel, Välikangas, 2003; Ortiz-de-Mandojana, Bansal, 2016; Granig, Hilgarter, 2020; Grego et al., 2024). Both pre-pandemic and 2020-2024 research papers emphasise that managing disruptions and unexpected events, in order to shorten adverse repercussions and accelerate an organisation's return to its original or better state, is a must.

At the same time, organisational resilience is a research subject that translates into an increasing number of publications, however, the undertaken attempts to operationalise and measure this phenomenon are of limited utility.

All to date's attempts to measure and assess organisational resilience have rather been modest, while discrepancies of a conceptual and definitional nature do not facilitate the operationalisation of the concept. However, no standard has been developed in this area, although promises of one were made in a number of pre-2020 scientific papers.

The pandemic-induced focus of research attention on the search for methods to measure organisational resilience has not resulted in any coherent, unambiguous solutions. The performed review of the literature indicated that the proposed model solutions had significant limitations and did not meet the needs of the business community. Importantly, their contextualisation did not allow for an assessment of any organisation and the progress it achieved in building organisational resilience (Lee et al., 2013). Some researchers (Yao, Fabbe-Costes, 2018) question the possibility of explicitly defining organisational resilience, which has its negative consequences for the development of an indicator to assess the likelihood of survival for an organisation.

The rather limited usefulness of measurement scales is also due to the fact that the resilience of a particular organisation is closely linked to a number of socio-cultural factors (cf. Lee et al., 2013), which are difficult to measure, and the concept of organisational resilience itself is multidimensional and dependent on a broader context. It is then to be expected that the issue of organisational resilience measurement will continue to be exposed.

The spread and further development of the concept of organisational resilience measurement is largely determined by the level of managerial awareness of the usefulness of such measurement for organisational survival and decision support.

## References

1. Ali, I., Gölgeci, I. (2019). Where is supply chain resilience research heading? A systematic and co-occurrence analysis. *International Journal of Physical Distribution & Logistics Management*, Vol. 49(8), pp. 793-815, doi:10.1108/ijpdlm-02-2019-0038
2. Annarelli A., Nonino F. (2016). Strategic and Operational Management of Organizational Resilience: Current State of Research and Future Directions. *Omega-International Journal of Management Science*, Vol. 62, pp. 1-18, doi:10.1016/j.omega.2015.08.004
3. Avey, J.B., Wernsing, T., Luthans, F. (2008). Can positive employees help positive organizational change? Impact of psychological capital and emotions on relevant attitudes and behaviours. *The Journal of Applied Behavioural Science*, 44(1), pp. 48-70, doi:10.1177/0021886307311470
4. Barbera, C., Jones, M., Korac, S., Saliterer, I., Steccolini, I. (2017). Governmental financial resilience under austerity in Austria, England and Italy: How do local governments cope



- with financial shocks? *Public Administration*, Vol. 95, Iss. 3, pp. 670-697, doi:10.1111/padm.12350
5. Barton, M.A., Kahn, W.A. (2019). Group resilience: The place and meaning of relational pauses. *Organization Studies*, Vol. 40(9), pp. 1409-1429, doi:10.1177/0170840618782294
  6. Canwat, V. (2024). COVID-19-related supply chain disruptions: resilience and vulnerability of micro, small and medium enterprises. *Cogent Business & Management*, Vol. 11, No. 1. doi:10.1080/23311975.2024.2315691
  7. Chang, A. (2021). Resource Stability and Federal Agency Performance. *American Review of Public Administration*, Vol. 51, Iss. 5, pp. 393-405.
  8. Chodyński, A. (2021). *Dynamika przedsiębiorczości i zarządzania innowacjami w firmach: Odpowiedzialność, prospołeczność, ekologia, bezpieczeństwo*. Kraków: Oficyna Wydawnicza KAAFm.
  9. Cimellaro, G.P., Reinhorn, A.M., Bruneau, M. (2010). Framework for analytical quantification of disaster resilience. *Engineering Structures*, Vol. 32(11), pp. 3639-3649, doi:10.1016/j.engstruct.2010.08.008
  10. Conz, E., Lamb, P.W., De Massis, A. (2020). Practicing resilience in family firms: An investigation through phenomenography. *Journal of Family Business Strategy*, Vol. 11, No. 2, doi: 10.1016/j.jfbs.2020.100355
  11. Cruz, C., Larraza-Kintana, M., Garcés-Galdeano, L., Berrone, P. (2014). Are Family Firms Really More Socially Responsible? *Entrepreneurship Theory and Practice*, Vol. 38(6), pp. 1295-1316, doi:10.1111/etap.12125
  12. Czakon, W. (2013). Metodyka systematycznego przeglądu literatury. In: W. Czakon (Ed.), *Podstawy metodologii badań w naukach o zarządzaniu*. Warszawa: Wolters Kluwer.
  13. Denyer, D., Tranfield, D. (2009). Producing a systematic review. In D.A. Buchanan, A. Bryman (Eds.), *The Sage handbook of organizational research methods*. pp. 671-689. Sage Publications Ltd.
  14. Duchek, S. (2020). Organizational resilience: a capability-based conceptualization. *Business Research*, Vol. 13, Iss. 1. Heidelberg: Springer, pp. 215-246, doi:10.1007/s40685-019-0085-7
  15. Dyduch, W. (2015). Cel i przebieg badań z wykorzystaniem metod ilościowych. In: W. Czakon (Ed.), *Podstawy metodologii i badań w naukach o zarządzaniu* (pp. 306-331). Warszawa: Wolters Kluwer.
  16. Filimonau, V., Derqui, B., Matute, J. (2020). The COVID-19 Pandemic and Organisational Commitment of Senior Hotel Managers. *International Journal of Hospitality Management*, Vol. 91, doi:10.1016/j.ijhm.2020.102659
  17. Fink, A. (2014). *Conducting research literature reviews: from the internet to paper*. [https://books.google.fi/books?id=Dg5zAwAAQBAJ&dq=fink+2014+conducting+research+literature+review&lr=&source=gbs\\_navlinks\\_s](https://books.google.fi/books?id=Dg5zAwAAQBAJ&dq=fink+2014+conducting+research+literature+review&lr=&source=gbs_navlinks_s)

18. Garcia-Perez, A., Cegarra, J.G., Sallos, M., Chinnaswamy, A. (2022). Resilience in healthcare systems: Cyber security and digital transformation. *Technovation*, Vol. 121, doi:10.1016/j.technovation.2022.102583
19. González, A.C., Pérez-Uribe, M.Á. (2021). Family business resilience under the COVID-19: A comparative study in the furniture industry in the United States of America and Colombia. *Estudios Gerenciales*, Vol. 37, No. 158, pp. 138-152, doi:10.18046/j.estger.2021.158.4423
20. Granig, P., Hilgarter, K. (2020). Organisational resilience: A qualitative study about how organisations handle trends and their effects on business models from experts' views. *International Journal of Innovation Science*, Vol. 12(5), pp. 525-544, doi:10.1108/IJIS-06-2020-0086
21. Greenham, T., Cox, E., Ryan-Collins, J. (2013). *Mapping Economic Resilience*. Friends Provident Foundation. www.friendsprovidentfoundation.org
22. Grego, M., Magnani, G., Denicolai, S. (2024). Transform to adapt or resilient by design? How organizations can foster resilience through business model transformation. *Journal of Business Research*, Vol. 171, doi:10.1016/j.jbusres.2023.114359
23. Hamel, G., Valikangas, L. (2003). The Quest for Resilience. *Harvard Business Review*, Vol. 81(9), pp. 52-63.
24. Hillmann, J., Guenther, E. (2021). Organizational Resilience: A Valuable Construct for Management Research? *International Journal of Management Reviews*, Vol. 23, No. 1, pp. 7-44, doi:10.1111/ijmr.12239
25. Ilseven, E., Puranam, P. (2021). Measuring organizational resilience as a performance outcome. *Journal of Organization Design*, Vol. 10, Iss. 3, pp. 127-137, doi:10.1007/s41469-021-00107-1
26. Ingram, T. (2023). *Odporność organizacyjna przedsiębiorstw rodzinnych*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, doi:10.22367/uekat.9788378758341
27. Korpysa, J., Oláh, J. (2024). Startups' organizational resilience in post-COVID times. *International Journal of Management and Economics*, Vol. 60(1), pp. 3-11, doi:10.2478/ijme-2023-0022
28. Kozielski, R. (2022). *Rynkowy due diligence. Pomiar odporności rynkowej organizacji*. Warszawa: PWN.
29. Kuciński, K. (2014). *Naukowe badanie zjawisk gospodarczych. Perspektywa metodologiczna*. Warszawa: Wolters Kluwer Polska.
30. Lee, A.V., Vargo, J.J., Seville, E. (2013). Developing a Tool to Measure and Compare Organizations' Resilience. *Natural Hazards Review*, Vol. 14, pp. 29-41.
31. Lestari, E.D., Abd Hamid, N., Shamsuddin, R., Kurniasari, F., Yaacob, Z. (2024). Investigating the factors of SMEs' business resilience in the post-pandemic crisis of COVID-19 with technology adoption as a quasi-moderator: a multigroup analysis of

- Indonesian and Malaysian SMEs. *Cogent Business & Management*, Vol. 11(1), doi:10.1080/23311975.2023.2301135
32. Linnenluecke, M.K. (2017). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews*, Vol. 19(4), pp. 4-30, doi:10.1111/ijmr.12076
33. Liu, X., Tse, Y.K., Wang, S., Sun, R. (2023). Unleashing the power of supply chain learning: An empirical investigation. *International Journal of Operations and Production Management*, Vol. 43(8), pp. 1250-1276, doi:10.1108/IJOPM-09-2022-0555
34. Mafabi, S., Munene, J.C., Ntayi, J.M. (2012). Knowledge management and organisational resilience: Organisational innovation as a mediator in Uganda parastatals. *Journal of Strategy and Management*, Vol 5(1), pp. 57-80. doi:10.1108/17554251211200455
35. Marcucci, G., Antomarioni, S., Ciarapica, F.E., Bevilacqua, M. (2021). The impact of operations and IT-related Industry 4.0 key technologies on organizational resilience. *Production Planning and Control*, Vol. 15, pp. 1-15, doi:10.1080/09537287.2021.1874702
36. McKnight, A., Rucci, M. (2020). The financial resilience of households: 22 country study with new estimates, breakdowns by household characteristics and a review of policy options. *CASE Papers /219*. Centre for Analysis of Social Exclusion, LSE.
37. McManus, S., Seville, E., Vargo, J., Brunson, D. (2008). Facilitated Process for Improving Organizational Resilience. *Natural Hazards Review*, Vol. 9(2), pp. 81-90, doi:10.1061/(ASCE)1527-6988(2008)9:2(81)
38. Melián-Alzola, L., Fernández-Monroy, M., Hidalgo-Peñate, M. (2020). Hotels in contexts of uncertainty: Measuring organisational resilience. *Tourism Management Perspectives*, Vol. 36, doi: 10.1016/j.tmp.2020.100747
39. Mitchell A. (2013). *Risk and Resilience: From Good Idea to Good Practice*. OECD Development Co-operation Working Papers, No. 13. Paris: OECD, doi:10.1787/5k3ttg4cxcbp-en
40. Nguyen, H., Pham, A.V., Pham, M.D., Pham, M.H. (2023). Business resilience: Lessons from government responses to the global COVID-19 crisis. *International Business Review*, Vol. 32(5), doi:10.1016/j.ibusrev.2023.102166
41. Ortiz-de-Mandojana, N., Bansal, P. (2016). The long-term benefits of organizational resilience through sustainable business practices. *Strategic Management Journal*, Vol. 37(8), pp. 1615-1631, <http://www.jstor.org/stable/43898026>
42. Parker, H., Ameen, K. (2018). The role of resilience capabilities in shaping how firms respond to disruptions. *Journal of Business Research*, Vol. 88, pp. 535-541, doi:10.1016/j.jbusres.2017.12.022
43. Pathak, D., Joshi, G. (2021). Impact of psychological capital and life satisfaction on organisational resilience during COVID-19: Indian tourism insights. *Current Issues in Tourism*, Vol. 24(17), pp. 2398-2415.

44. Păunescu, C., Mátyus, E. (2020). Resilience measures to dealing with the COVID-19 pandemic: Evidence from Romanian micro and small enterprises. *Management & Marketing, Vol. 15(s1)*, pp. 439-457, doi:10.2478/mmcks-2020-0026
45. Pavez, I., Gomez, H., Laulie, L., Gonzalez, V.A. (2021), Project Team Resilience: The Effect of Group Potency and Interpersonal Trust. *International Journal of Project Management, Vol. 39(6)*, pp. 697-708, doi:10.1016/j.ijproman.2021.06.004
46. Podsakoff, P.M., MacKenzie, S.B., Podsakoff, N.P. (2016). Recommendations for Creating Better Concept Definitions in the Organizational, Behavioral, and Social Sciences. *Organizational Research Methods, Vol. 19(2)*, pp. 159-203. doi:10.1177/1094428115624965
47. Reinmoeller, P., Van Baardwijk, N. (2005). The link between diversity and resilience. *MIT Sloan Management Review, Vol. 46(4)*, pp. 61-65.
48. Romanowska, M. (2012). *Przedsiębiorstwo odporne na kryzys*. Warszawa: Oficyna Wydawnicza SGH.
49. Rubakha, M., Tkachyk, L., Pryimak, I. (2024). Factor analysis of financial performance and formation of strategic resilience in Ukrainian IT companies under the challenges of war. *Financial and Credit Activity: Problems of Theory and Practice, Vol. 1(54)*, pp. 260-281, doi:10.55643/fcaptop.1.54.2024.4229
50. Rzegocki, M. (2021). *Prężność organizacyjna jako zasób kluczowy dla odporności organizacji na kryzys*. Warszawa: WSIZ.
51. Sahebjamnia, N., Torabi, S.A., Mansouri, S.A. (2018). Building Organizational Resilience in the Face of Multiple Disruptions. *International Journal of Production Economics, Vol. 197*, pp. 63-83, doi:10.1016/j.ijpe.2017.12.009
52. Sajko, M., Boone, C., Buyl, T. (2020). CEO greed, corporate social responsibility, and organizational resilience to systemic shocks. *Journal of Management, Vol. 47, No. 4*, doi:10.1177/0149206320902528
53. Samborski, A. (2022). Resilience of Polish Non-financial Corporations Under Economic Shocks. *Scientific Papers of Silesian University of Technology. Organization and Management, Series, No. 163*, pp. 505-519, doi:10.29119/1641-3466.2022.163.31
54. Scherbaum, C., Meade, A. (2013). New directions for measurement in management research. *International Journal of Management Reviews, Vol. 15(2)*, pp. 132-148, doi:10.1111/ijmr.12003
55. Searing, E.A.M., Wiley, K.K., Young, S.L. (2021). Resiliency tactics during financial crisis: The nonprofit resiliency framework. *Nonprofit Management & Leadership, Vol. 32, Iss. 2*, pp. 179-196, doi:10.1002/nml.21478
56. Sevilla, J., Ruiz-Martín, C., Nebro, J.J., López-Paredes, A. (2023). Why can organizational resilience not be measured? *Journal of Business Economics and Management, 24(2)*, pp. 199-220, doi:10.3846/jbem.2023.18819

57. Shela, V., Ramayah, T., Noor Hazlina, A. (2023). Human capital and organisational resilience in the context of manufacturing: A systematic literature review. *Journal of Intellectual Capital*, Vol. 24(2), pp. 535-559, doi:10.1108/JIC-09-2021-0234
58. Stephenson, A. (2010). *Benchmarking the Resilience of Organizations*. Ph.D. thesis, Christchurch.
59. Stephenson, A., Seville, E., Vargo, J., Roger, D. (2010). *Benchmark Resilience: A study of the resilience of organisations in the Auckland Region*. <https://resorgs.org.nz/wp-content/uploads/2017/07/benchmark-resilience-resorgs-research-reportb.pdf>
60. Torres, A.P., Marshall, M.I., Sydnor, S. (2019). Does social capital pay off? The case of small business resilience after Hurricane Katrina. *Journal of Contingencies and Crisis Management*, Vol. 27, No. 2, pp. 168-181, doi:10.1111/1468-5973.12248
61. Troise, C., Corvello, V., Ghobadian, A., O'Regan, N. (2022). How can SMEs successfully navigate VUCA environment: The role of agility in the digital transformation era. *Technological Forecasting and Social Change*, Vol. 174, doi:10.1016/j.techfore.2021.121227
62. Weick, K.E., Roberts, K.H. (1993). Collective Mind in Organizations: Heedful Interrelating on Flight Decks. *Administrative Science Quarterly*, Vol. 38, pp. 357-381, doi:10.2307/2393372
63. Weick, K.E. (1993). The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster. *Administrative Science Quarterly*, Vol. 38, pp. 628-652, doi:10.2307/2393339
64. Williams, T.A., Gruber, D.A., Sutcliffe, K.M., Zhao, E.Y. et al. (2017). Organizational response to adversity: Fusing crisis management and resilience research streams. *The Academy of Management Annals*, Vol. 11(2), pp. 733-769, doi:10.5465/annals.2015.0134
65. Yao, Y., Fabbe-Costes, N. (2018). Can you measure resilience if you are unable to define it? The analysis of Supply Network Resilience. *Supply Chain Forum: An International Journal*, Vol. 19(4), pp. 255-265, doi:10.1080/16258312.2018.1540248



## DECISION-MAKING PROBLEMS RELATED TO INTELLECTUAL CAPITAL CONTROL OF THE COMPANY

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**Purpose:** The purpose of the paper is to identify the main decision-making problems related to intellectual capital control of the company.

**Design/methodology/approach:** This study followed the methodology of a systematic review of literature, textual content analysis and deduction. In particular, it reviews papers published in the Web of Science database and presents the most critical decision-making problems.

**Findings:** Control is an integral part of intellectual capital management. Discovering and implementing effective intellectual capital control patterns require embedding the organization in an environment of complex interactions and taking into account the expectations of stakeholders. The issues of control (as a function of organization management) and the specificity of intellectual capital were the basis to identify decision-making problems related to the control of this intangible resource. Interesting managerial problems and dilemmas emerge when the concept of intellectual capital management is compared with the general issues of organization management and its classic approach, treated as a logical sequence of functions: planning, organizing, motivating and finally control, which is the focus of this study.

**Practical implications:** Recognizing the need for diagnosis and control of intellectual capital (IC) may be a premise for initiatives and changes in non-financial reporting by companies. Specific postulates can help decision-makers notice critical factors in the area of IC planning and control. However, the proposed list of decision-making problems is not complete; further diagnosis will help better adapt management solutions in the future.

**Originality/value:** The postulates regarding IC control activities are an original combination of research approaches presented in the literature.

**Keywords:** expectations of stakeholders, intellectual capital control.

**Category of the paper:** Conceptual paper.

### 1. Introduction

The review of literature dealing with the managing of intangible resources of the company reveals that this is a multithreaded research area. In particular, intellectual capital (IC) is indicated as a source of radical change in the way of thinking and acting of an organization (Farzaneh et al., 2022; Chen et al., 2021; Barpanda, Bontis, 2021). At the same time, the lack

of standards to verify or compare the level of this capital in companies of various industries and the high risk of making interpretation errors, resulting from imperfections of measurement methods, cause that theoretical approaches dominate in scientific studies, while practical applications of the IC management are greatly limited (e.g. to listed companies). Numerous research results are published, but their authors usually focus on a selected dimension of IC (human capital, structural capital, relational capital, green intellectual capital) or a specific sector (banking sector, technology listed companies, pharmaceutical industry) or type of organization. Despite the growing interest in the issue of IC management, there are still research gaps, including the systematization of the conceptual apparatus. The concepts of intellectual capital management are dispersed. Importantly, the mere possession and reporting of intellectual capital resources by a company does not guarantee success (Dumay et al., 2020; Mouritsen, Roslender, 2009). The effectiveness of activities aimed at continuous improvement depends on the process of control (Cyfert, Skorb-Gała, 2015, p. 177). However, the intangible nature of this capital means that the IC planning and control elude scientific explanation, these issues are omitted or studied in few works.

The purpose of the study is to identify the main decision-making problems related to intellectual capital control of the company.

The most important research paths, that have been widely explored so far, concern non-financial integrated reporting (Guthrie et al., 2012; Dumay et al., 2016). There is a shortage of methods for measuring intellectual capital and this has serious consequences for the process of control. Still a large value of intangible assets is not reported. As Urbanek emphasizes, the lack of reliable and generally accepted intellectual capital measurement methods leads to information asymmetry between stakeholders, biased market valuation of the company, fluctuations in capital markets and improper allocation of investment funds. Therefore, measurement is necessary to obtain the information that will help increase the transparency of markets (Urbanek, 2007). Also from the perspective of the inside of the organization, it is crucial to monitor the process of transforming intellectual resources into a specific added value. This is particularly problematic in complex and dynamic environmental conditions. All this makes it necessary to redefine management methods, also in relation to IC. Most researchers agree that the process of measuring intellectual capital is difficult, because it concerns factors that are hard to measure, and whose impact on the company's results is often very elusive (Frączek, 2012). Given the above, the conclusion can be drawn that the lack of standardized, objective and cyclical information on the state of intellectual capital results in inefficiency of its assessment, problems with audit and control systems. This gave rise to undertaking research in this area.



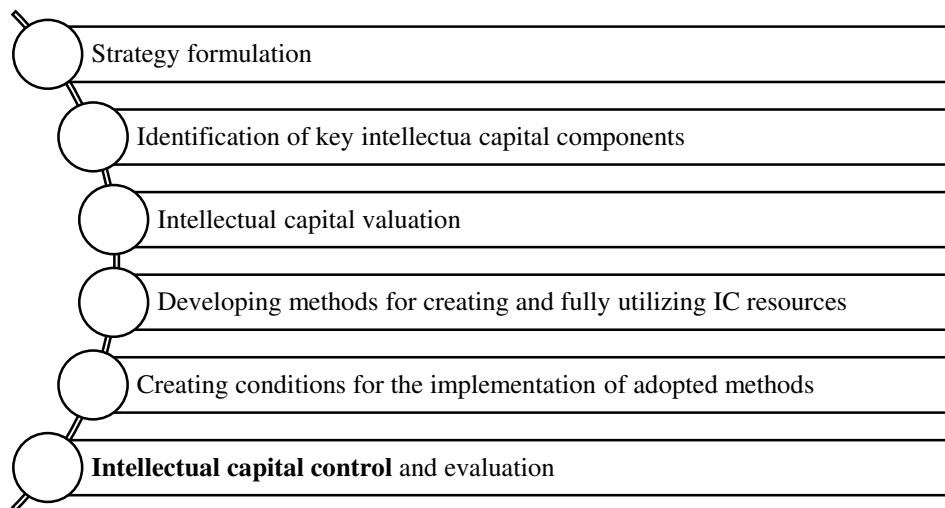
## 2. Planes and challenges for intellectual capital control – Literature review

According to literature, control is a comparison of the actual and planned state; it is a process of measuring effectiveness. According to Fayol, control is checking whether everything is going according to the plan, instructions and rules (Fayol, 1949, p. 107). The function of control is prevention and inspiration, and at a lower level of generalization, it has an informative, instructional, stimulating, signalling and prophylactic function. The process of control is based on at least four stages: 1. setting standards; 2. measuring; 3. comparison; 4. evaluation (Griffin, 1996). In the broader approach, it is also important to take actions to bring the results closer to the plans (Bieniok, 2011). There are many types of control: strategic, operational, tactical, current, periodic, segmental, comprehensive, functional, thematic, etc. (Szczepankowski, 2010). Control is distinguished from audit and controlling. A special form of control are external controls (e.g. by tax administration) and due diligence.

In Poland, Kotarbiński formulated numerous indications regarding the effectiveness of actions. They can be considered as benchmarks for control activities. These are: accuracy, productivity, economy, simplicity, efficiency, certainty, correctness, completeness of information, caution and boldness, energy and reliability (Kotarbiński, 1969). The effectiveness of control is increased by: accuracy of information (precision of standards and data), validity, objectivity of controllers, comprehensibility of work results, focus on important matters, realism (economic, social, cultural, political, organizational), coordination of activities, flexibility, normativity and operability (indications of improvement), social acceptance (Stoner, Wankel, 1997).

According to literature, control is an important factor in creating competitive advantage, determining the success of activities carried out in organizations (Simons, 1998). It can therefore be considered indispensable also in relation to intellectual capital, which is defined as knowledge that can be turned into profit (Sullivan, 2001) or as "the sum of hidden, not fully visible in the balance sheet, assets of the company" (Roos et al., 1997). At the same time, it is indicated that intellectual capital has certain characteristics similar to other forms of capital (physical, financial), therefore, it becomes reasonable to refer to the management function when identifying mechanisms for effective IC management. Classically, management is described as a set of activities in the area of planning, organization, motivation and control (Griffin, 1996). This logical sequence of functions, focused on the use of company resources, should streamline the process of decision-making. At the same time, it should be implemented in a way that ensures the full use of resources, both those recorded in the books of accounts and intangible assets.

There are original concepts and approaches to the process of intellectual capital management which covers certain components, from identification, through development and assessment, and includes human and structural capital. The last stage of the process is evaluation, i.e. obtaining feedback on the state of intellectual resources and the degree of their use. Sequences of the intellectual capital management are presented in Figure 1. The process of capital management requires identification and assessment of the role of intellectual capital resources already at the stage of formulating strategy. The diagnosis of intellectual capital is to be used in the next stage to develop methods for creating, acquiring, transferring and fully utilizing this asset. Creating conditions for implementation of the adopted methods includes, among others: investments in the development of modern information technologies, development and improvement of employees' qualifications and striving for effective information management. The whole process ends with the assessment of intellectual capital in the context of meeting the strategic goals of the company.

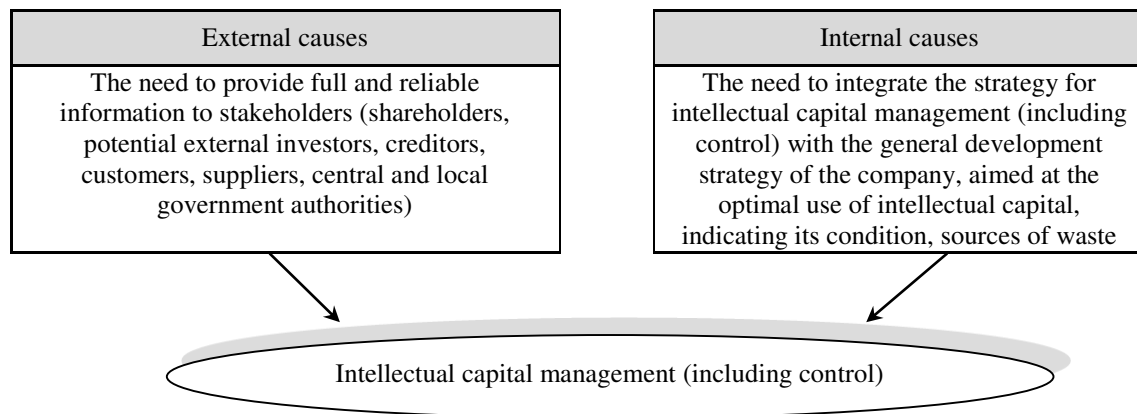


**Figure 1.** The process of managing the intellectual capital (IC).

Source: author's elaboration based on (Mikuła et al., 2007, p. 108).

The review of studies reveals that the area of intellectual capital control has been very poorly identified. The main reason for this seems to be understanding control as identification of deviations in the level of controlled resources using measurement methods. However, no standardized intellectual capital measurement methods have been proposed so far, which has far-reaching consequences.

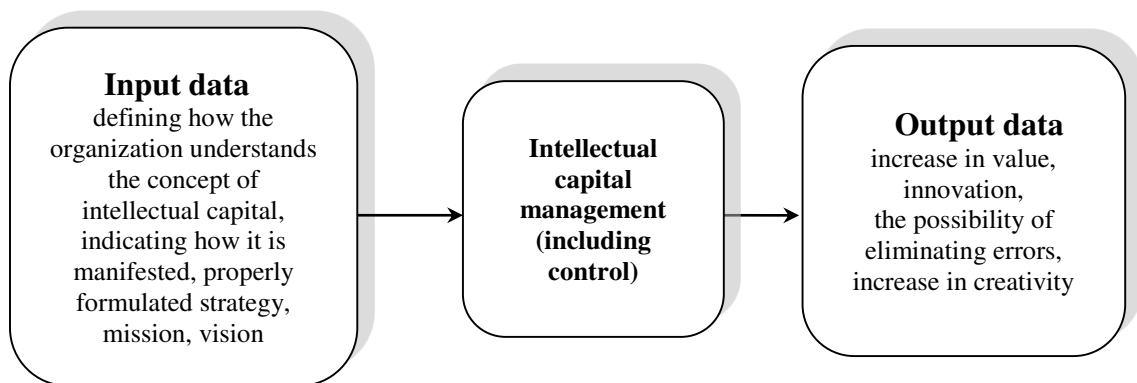
An interest in this issue results from internal and external factors (Figure 2).



**Figure 2.** Reasons for interest in the intellectual capital management (including control).

Source: author's elaboration.

The process of intellectual capital management requires defining the concept of input and output data. As shown in Figure 3, the company needs to specify how it understands the term intellectual capital, identify its key components, design and implement the appropriate management system.



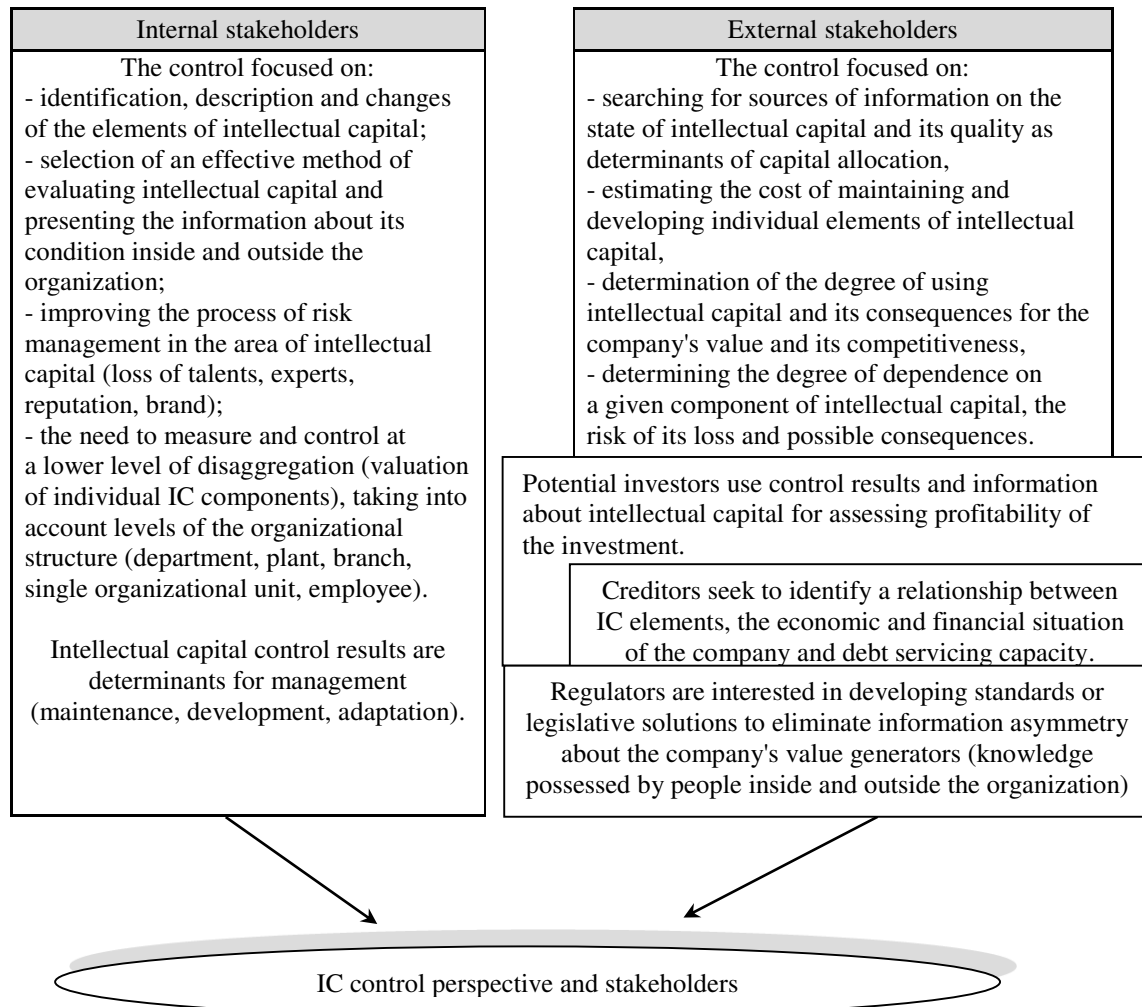
**Figure 3.** Intellectual capital management system - input and output data.

Source: author's elaboration.

The issue of control, audit and evaluation of intellectual capital involves defining several perspectives. The scope of control is derived from the range of valuation and management. From the perspective of usefulness, it is necessary to determine whether the intellectual capital control involves the entire company, individual departments or management levels. It is recommended that the level of control (and earlier valuation) be determined each time, individually for each organization, taking into account specificity of the company. The determinants of solutions include: size (in a small company the inspection may involve every employee), type of business, and finally the level of decision-makers' awareness.

The second key perspective is the subjective approach, i.e. presenting to stakeholders information on the state of intellectual capital in the form of a report as the final result of control. Stakeholders are interested in obtaining the information about the value of the company, development potential and results (Marcinkowska, 2005). The recipients of the information

about intellectual capital, its value and effectiveness include internal stakeholders (management staff, owners) and external stakeholders (capital providers, creditors), closer and further to the company. The post-inspection report on the state of intellectual capital is a communication channel to transfer information about the company to the outside world. Figure 4 illustrates the range of audit issues that are relevant to external and internal recipients.



**Figure 4.** The planes of control and presentation of the results of intellectual capital assessment and types of stakeholders.

Source: author's elaboration based on (Cuganesan, 2006, pp. 164-188; Marcinkowska, 2005).

Regardless of the economic conditions, the main reasons for interest in the intellectual capital management (also control) include the need to provide complete and reliable information to stakeholders. However, in practice the area of reporting, which is supposed to provide such information, is rather neglected. The results of the author's analyses show that the reports on the intellectual capital status of the companies listed in the WIG-20 index are very limited. The analysis of documentation reveals that integrated reports, which are the basic tool for managing trust in relations with external stakeholders, are limited to determining in which areas the intellectual capital is manifested. There is no information about its condition or changes in value over the years. In the reports, companies usually include selected aspects of

the intellectual capital management, most often focusing on human capital. A fragmentary diagnosis of the state of intellectual capital does not favour accurate management decisions and effective control.

Standardized, cyclical and objective post-inspection information is a premise for decisions made by potential investors. In addition, quantification and monetary valuation allow for comparability and make the reports useful for decision-making purposes. The interest of internal management is somewhat different. Disclosure of key intellectual capital assets may have an undesirable effect. The recipients of the reports on the state of intellectual capital are not only potential investors, but also competitors who, in extreme cases, may act to the detriment of the company by, for example, taking over key resources (e.g. employed experts). The assumption is that intellectual resources are to contribute to gaining a competitive advantage. Therefore, it is inadvisable for information on the state of intellectual capital to be universal and rigid. For management purposes, it should be qualitative and non-monetary. This fact may affect the final shape of reports.

Measurement, evaluation and, consequently, reporting of intellectual capital should concern the same period for which the financial statement is prepared (Lev, 2001). Specific management needs may require increased frequency of reporting and control of intellectual capital. Then the information about the state of intellectual capital must be provided to decision-makers immediately. This means that the frequency of reporting should meet the expectations of internal stakeholders. The frequency of such disclosures for capital providers and potential investors is relatively lower and should be determined after cost-benefit analysis. In this context, it should be considered whether post-inspection reports should not consist of two parts - the one for external stakeholders and a separate one for decision-makers within the organization. However, this is in contradiction with the idea of integrated reporting, the purpose of which is to create a single, common report allowing to identify the sources of value creation in the company. Currently, potential users of financial statements have no possibility to demand reports tailored to their specific information needs (Turyna, 2005, p. 49).

Given the above, the following decision-making problems related to the intellectual capital control in the organization emerge:

1. What pattern of intellectual capital control/auditing should be adopted so that it is useful both for the management staff and potential investors?
2. What form should the report on the state of intellectual capital take in order to become useful for the implementation of all management objectives, including control?
3. Can the quality of information be guaranteed only if the assessment is made by external intellectual capital audit? Or, should the assessment be made by the company's departments due to the care to keep secrets about key resources?

The review of the literature does not provide unequivocal answers to these questions.

### 3. Methods

To achieve the aim formulated in the introduction, the systematic review of the literature was made, which focused on the part that deliberately, and not incidentally, refers to the control of intellectual capital. In other words, studies that were wholly or largely devoted to these aspects were taken into account.

Systematic review techniques are about to become the "new normal" in reviews of management research (Hiebl, 2023, p. 229).

The bibliometric analysis of the studies published by scientific centres revealed that the issue of intellectual capital control is a new area that requires research exploration. The search in the Web of Science database for the terms "intellectual capital" and "control" (in title or abstract) was limited to the English-language, open access articles in the "Management" and "Business" sections. As a result, only 41 records were obtained (Table 1).

**Table 1.**

*Steps of a systematic literature review – database Web of Science (23.09.2024)*

| Steps of a systematic literature review                                  | Number of results |
|--|-------------------|
| 1. Results for: Title or Abstract = "Intellectual capital" and "control" | 492               |
| 2. Narrowing to Web of Science Categories = "Management" and "Business"  | 201               |
| 3. Narrowing to English language   | 193               |
| 4. Narrowing to Document types: Article (open access)                    | 35                |

Source: author's elaboration.

Assuming the existence of scientific articles referring explicitly to the intellectual capital control, the database was also searched using the terms "audit" + "intellectual capital". Ultimately (using such a configuration of terms) the returned records did not refer to the subject in question (they contained research results combining issues such as the audit committee, the effectiveness of corporate governance), so they were not included in further analysis.

Ultimately, 35 studies dealing with the topic of intellectual capital control in various dimensions were obtained. Their analysis showed that most of the studies were proposals to expand financial reporting or they were critical analysis of the methods of quantification of intangible resources, ending with the conclusion that measurement tools are imperfect and, as a result, control activities are greatly hindered. Noteworthy is the study indicating the contribution and importance of intellectual capital monitoring to minimizing costs in public administration, but also this article does not strictly apply to the intellectual capital control (Sousa et al., 2016).

In the next step, the content analysis of the studies indicates the two research areas: result-oriented control (report) and process-oriented control (a significant deficiency can be observed in this area) (Table 2).

**Table 2.***Review of selected studies on the IC control –database Web of Science*

| <b>Author, year, title</b>   | <b>Research areas</b>   |
|--|---|
| Wirasedana, I.W.P., Sudarma, M., Andayani, W., Mulawarman, A.D. (2024). The role of capital in microfinance financial performance and cultural sustainability  | result-oriented control (report)                              |
| Kabuye, F., Alinda, K., Bugambiro, N., Kezaabu, S. (2021). Intellectual capital, isomorphic forces and internal controls over financial reporting in Ugandan microfinance institutions. <i>Cogent Business &amp; Management</i> , 8(1), 1944960. doi:10.1080/23311975.2021.1944960 | result-oriented control (report) and process-oriented control |
| Gavana, G., Gottardo, P., Moisello, A.M. (2021). Family control and influence on JV investment – the moderating effect of JV type and IC components.   | result-oriented control (report)                              |
| Guerrero, M., Herrera, F., Urbano, D. (2021). Does policy enhance collaborative-opportunistic behaviours? Looking into the intellectual capital dynamics of subsidized industry–university partnerships.   | result-oriented control                                       |
| Oliveira, M., Curado, C., Balle, A.R., Kianto, A. (2020). Knowledge sharing, intellectual capital and organizational results in SMES: are they related?  | result-oriented control (report)                              |
| Rabaya, A.J.R., Saleh, N.M., Hamzah, N. (2020). Intellectual Capital Performance and Firm Value: The Effect of MFRS 139  | result-oriented control (report)                              |
| Tejedo-Romero, F., Araujo, J.F.F.E. (2020). The influence of corporate governance characteristics on human capital disclosure: the moderating role of managerial ownership.  | result-oriented control (report) and process-oriented control |
| Hussinki, H., Ritala, P., Vanhala, M., Kianto, A. (2017). Intellectual capital, knowledge management practices and firm performance.   | result-oriented control                                       |
| Sousa, W.V.C., Ribeiro, C., Rodriguez, M.V.R.Y. (2016). The contribution of intellectual capital management to minimize the hidden costs in public administration.   | result-oriented control (report)                              |
| Bontis, N., Girardi, J. (2000). Teaching knowledge management and intellectual capital lessons: an empirical examination of the Tango simulation.  | process-oriented control                                      |

Source: author's elaboration.

The review of studies also shows that board composition and functioning are mechanisms of supervision, control and legitimacy that promote human capital disclosure, with managerial ownership acting as moderator for aligning interests between managers and stakeholders (Tejedo-Romero, Araujo, 2020, p. 342).

Given the above, the problems, postulates and recommendations regarding intellectual capital control activities (in the next part of the paper) are creative combinations of the few research ideas presented in the literature. Broker Technology by Brooking (1997), Intellectual Capital Statement (Bukh et al., 2001) and the knowledge management audit tool proposed by Kowalczyk and Nogalski (2007) were the theoretical framework for the issues discussed in the article. The research perspective presented by Ujwary-Gil (2017) was also used. It concerned a related topic - audit of intangible assets (a term broader than IC). Ujwary, who also points to the need for an iterative audit cycle of intangible assets, created a methodology for auditing organizational intangible assets using the approach developed by Hong, Van den Goor, Brinkkemper (1993).

## 4. Findings

The author's own research, to a certain extent, allowed to suggest a set of recommendations for solving decision-making problems by managers taking into account the role of intellectual capital for the success of the organization (Table 3). Bukowitz and Williams assume that management is a process through which an organization generates wealth based on intellectual capital (Bukowitz, Williams, 1999). When implementing the IC control, managers are forced to solve various decision-making problems. As shown in the Teable 3, it is necessary to perform risk calculation, to make decisions regarding the selection of a unit that audits intellectual capital and to identify recipients of the information on intellectual capital.

While financial information is dedicated to a fairly narrow group of specialists (financial directors, accountants, auditors, analysts, tax advisors, etc.), the information on intellectual capital is addressed to a much more diversified group of recipients, which has multifaceted consequences.

In addition, there are not enough external forces, such as legal regulations or forcing companies to measure and control intellectual capital (currently, the European Union directive imposes the obligation to report intellectual capital by selected companies). However, the measurement, management and control of intellectual capital is something illusory for the average manager, and for many companies the profit is still the priority.

Therefore, the table also presents a set of recommendations and postulates regarding decision-making problems.

**Table 3.**

*Intellectual capital control problems and recommendations for their possible solution*

| <b>Will the integrated model allow for a comprehensive diagnosis of the intellectual capital, its control and adoption of optimal solutions at the management level, or will it be necessary to control individual departments, management levels, etc.? What pattern of intellectual capital control/auditing should be adopted so that it is useful both for the management staff and potential investors?</b> |   |
|--|---|
| <b>Problem 1 – the usefulness of control</b>   |   |
| Control dedicated to internal stakeholders   | Control dedicated to external stakeholders  |
| Information "on demand", used for the process of decision making by the managerial staff, taking into account the context of the organization's functioning, having a quantitative and qualitative nature.   | Cyclic, objective, standardized, quantitative information.                        |
| <b>Recommendations</b>   |   |
| It should be considered whether post-inspection reports should not consist of two parts - the one for external stakeholders and a separate one for decision-making processes within the organization. Reports for external stakeholders must be approved by the management board, while those for decision-making processes are approved by the steering committee.  |   |
| <b>Problem 2 – the scope of diagnosis and control</b>  |   |
| Total/holistic control   | Control of individual departments   |
| The results of this control are crucial for strategic management focused on improving the organization as a whole.   | The results of this control are the basis for decisions at the operational level. |



Cont. table 3.

| <b>Recommendations</b>  |   |
|---|---|
| <p>Determining the risk associated with the loss of intellectual capital requires control, ranging from a single organizational unit to the entire organization, so that the desired economic effect is possible to achieve. Prospective analysis always requires taking into account changes in the environment and planning rational protective measures (e.g. redundancies, acquiring talents).</p> <p>Priorities are set on a case-by-case basis based on the detailed equity value formula and the current situation. The scope of control must also take into account the legitimacy of the expenditure (time, labour, etc.).</p> |   |
| <b>What form should the report on the state of intellectual capital take in order to become useful for the implementation of all management objectives, including control?</b>  |   |
| <b>Problem 3 – the form of report on the state of intellectual capital/scope of post-inspection information</b>   |   |
| Universal, standardized form of IC control results presentation, mimetic.   | Distinctiveness is a priority, non-standard form of the report, adapted to the specifics of the organization.   |
| <p>On the one hand, decision-makers strive to obtain comprehensive information to make optimal management decisions BUT</p> <p>Detailed post-inspection reports are laborious and costly. Too much information is as harmful as not enough. An increase in the amount of post-inspection information does not necessarily translate into the accuracy of making decisions. Competitors and independent analysts are a group particularly interested in increasing the amount of the information included in post-inspection reports.</p>  |   |
| <b>Can the quality of information be guaranteed only if the assessment is made by external intellectual capital audit? Or, should the assessment be made by the company's departments due to the care to keep secrets about key resources?</b>  |   |
| <b>Problem 4 – the scope of disclosure in control results</b>   |   |
| Information protection and security   | Transparency  |
| <p>Choosing an internal control unit guarantees confidentiality about key assets and involves less risk BUT</p> <p>the competencies of internal units do not guarantee maintaining the appropriate quality of procedures and thus obtaining reliable results</p>  | <p>The choice of an external and independent control entity favours obtaining objective information BUT</p> <p>involves a greater risk of losing the intellectual capital and taking it over by competitors</p>     |
| <b>Recommendations</b>  |   |
| <p>Cooperation with scientific research centres during the intellectual capital control may become a guarantee of confidentiality, adequate intensity and enrich management practices.</p>  |   |
| <b>Problem 5 – the intensity of control activities</b>  |   |
| Low intensity of control activities   | High intensity of control activities  |
| <p>It may result from the lack of adequate tools supporting the process of control, ignorance or reluctance to undertake control activities.</p>  | <p>It may be too restrictive or it may be an excessive burden for employees, limiting freedom of actions and creativity, and even cause resistance.</p>   |
| <b>Recommendations</b>  |   |
| <p>The need to adopt solutions appropriate for the specificity of the company, taking into account the dynamics of changes in the environment, which determines, for example, the intensity of control activities. The frequency and intensity of control activities should be determined after cost-benefit analysis.</p>  |   |
| <b>Problem 6 - priority of follow-up activities</b>   |   |
| Emphasis on the economic effect   | Emphasis on the non-economic effect   |
| <p>Focus on the effectiveness of intellectual capital manifested, among others, in generating profit.</p>   | <p>Determining the best practices for using intellectual capital within the organization, creating conditions for their duplication or continuation, taking into account social and environmental effects, etc.</p> |
| <b>Recommendations</b>  |   |
| <p>Depending on the current trends, the emphasis (on economic and non-economic results) should be spread out so that the stock market value of the company increases.</p>   |   |

Source: author's elaboration.

The multidimensionality and complexity of decision-making problems is a serious management challenge, but the benefits that the control of intellectual capital resources and, consequently, their efficient management can bring, cannot be overestimated. These include:

- a) increase in the value of intellectual capital and increase in the rate of return on capital invested in the company and the shareholder value. According to literature, IC is a driver of better business performance (Campos et al., 2022; Dumay, Garanina, 2013),
- b) making conscious and well-thought-out decisions regarding development of the IC and identifying the most valuable IC components and providing them with the best protection, e.g. green intellectual capital (Sheikh, 2022; Asiaei et al., 2022; Bombiak, 2022).

## 5. Summary

The research results allowed the author to formulate the general conclusions. First of all, the intellectual capital control is an indispensable element of the effective company management. Its proper implementation and reconciliation of contradictions can increase the efficiency of the entire organization.

The review of the literature indicates that studies dealing with the result-oriented control (report) are numerous, while those focused on process-oriented control and decision-making problems are rare. Extending the intellectual capital by this aspect of control is important from a practical implementation.

The article presents fundamental contemporary challenges related to the development and exploitation of the idea of intellectual capital control. Interesting managerial problems and dilemmas emerge when the concepts of intellectual capital management are compared with the general issues of organization management. In the classic approach, management is treated as a logical sequence of the following functions: planning, organizing, motivating and controlling. They are to prepare, evaluate and improve decision-making processes and methods of implementing managerial choices. However, many reservations have been expressed against this simplification. Nevertheless, this approach is used for research and presentations aimed at transparently reaching the essence of managerial decisions, as indicated by Bieniok (2011) and Kostera (2014). The new approach to management and the results of own research revealed specific decision-making issues that need to be addressed in every organization aware of the opportunities created by the intellectual capital.

Recognizing the need for diagnosis and control of IC may be a premise for initiatives and changes in non-financial reporting by companies. Specific postulates can help decision-makers notice critical factors in the area of IC planning and control. However, the proposed list of decision-making problems is not complete; further diagnosis will help better adapt management solutions in the future.

## References

1. Asiaei, K., Jusoh, R., Barani, O., Asiaei, A. (2022). How does green intellectual capital boost performance? The mediating role of environmental performance measurement systems. *Business Strategy and the Environment*, Vol. 31(4), pp. 1587-1606, doi: 10.1002/bse.2971.
2. Barpanda, S., Bontis, N. (2021). Human resource practices and performance in microfinance organizations: Do intellectual capital components matter? *Knowledge and Process Management*, Vol. 28(3), pp. 209-222, doi: 10.1002/kpm.1661.
3. Bieniok, H. (2011). *Metody sprawnego zarządzania. Planowanie, motywowanie, organizowanie i kontrola*. Warszawa: Placet.
4. Bombiak, E. (2022). *Budowanie zielonego kapitału intelektualnego w organizacjach*. Siedlce: Uniwersytet Przyrodniczo-Humanistyczny.
5. Bontis, N., Girardi, J. (2000). Teaching knowledge management and intellectual capital lessons: an empirical examination of the Tango simulation. *International Journal of Technology Management*, Vol. 20, pp. 545-555, doi:10.1504/ijtm.2000.002880.
6. Brooking, A. (1997). *Intellectual Capital*. London/New York: International Thomson Business Press.
7. Bukh, P.N., Larsen, H.T., Mouritsen, J. (2001). Constructing intellectual capital statements. *Scandinavian Journal of Management*, Vol. 17(1), pp. 87-108, doi: 10.1016/S0956-5221(00)00034-8.
8. Bukowitz, W., Williams, R. (1999). *The Knowledge Management Fieldbook*. Financial Times, Prentice Hall,
9. Campos, S., Dias, J.G., Teixeira, M.S., Correia, R.J. (2022). The link between intellectual capital and business performance: a mediation chain approach. *Journal of Intellectual Capital*, Vol. 23(2), pp. 401-419, doi: 10.1108/JIC-12-2019-0302.
10. Chen, M.Y.C., Lam, L.W., Zhu, J.N.Y. (2021). Should companies invest in human resource development practices? The role of intellectual capital and organizational performance improvements. *Personnel Review*, Vol. 50(2), pp. 460-477, doi: 10.1108/PR-04-2019-0179.
11. Cuganesan, S. (2006). Reporting organisational performance in managing human resources: Intellectual capital or stakeholder perspectives? *Journal of Human Resource Costing & Accounting*, Vol. 10 (3), pp. 164-188, doi: 10.1108/14013380610718629.
12. Cyfert, Sz., Skorb-Gała A. (2015). Procesy kontroli kierowniczej w polskich przedsiębiorstwach. *Acta Universitatis Nicolai Copernici*, Vol. 2, pp. 177-188, doi: 10.12775/AUNC\_ZARZ.2015.027.
13. Dumay, J., Bernardi, C., Guthrie, J., Demartini, P. (2016). Integrated reporting: A structured literature review. *Accounting Forum*, Vol. 40(3), pp. 166-185,

- doi:10.1016/j.accfor.2016.06.001.
14. Dumay, J., Garanina, T. (2013). Intellectual capital research: a critical examination of the third stage. *Journal of Intellectual Capital*, Vol. 14(1), pp. 10-25. <https://doi.org/10.1108/14691931311288995>.
  15. Dumay, J., Guthrie, J., Rooney, J. (2020) Being critical about intellectual capital accounting in 2020: An overview. *Critical Perspectives on Accounting*, Vol. 70, doi:10.1016/j.cpa.2020.102185.
  16. Farzaneh, M., Wilden, R., Afshari, L., Mehralian, G. (2022). Dynamic capabilities and innovation ambidexterity: The roles of intellectual capital and innovation orientation. *Journal of Business Research*, Vol. 148, pp. 47-59, doi:10.1016/j.jbusres.2022.04.030.
  17. Fayol, H. (1949). *General and Industrial Management*. New York: Pitman Publishing.
  18. Frączek, P. (2012). Uwarunkowania pomiaru kapitału intelektualnego. *Nierówności Społeczne a Wzrost Gospodarczy*, Vol. 27, pp. 15-23.
  19. Gavana, G., Gottardo, P., Moisello, A.M. (2021). Family control and influence on JV investment – the moderating effect of JV type and IC components. *Journal of Intellectual Capital*, Vol. 22, pp. 68-91, doi: 10.1108/JIC-12-2020-0376.
  20. Griffin, R.W. (1996). *Podstawy zarządzania organizacjami*. Warszawa: PWN.
  21. Guerrero, M., Herrera, F., Urbano, D. (2021). Does policy enhance collaborative-opportunistic behaviours? Looking into the intellectual capital dynamics of subsidized industry–university partnerships. *Journal of Intellectual Capital*, Vol. 22(6), pp. 1055-1081. doi: 10.1108/JIC-07-2020-0254.
  22. Guthrie, J., Ricceri, F., Dumay, J. (2012). Reflections and projections: A decade of Intellectual Capital Accounting Research. *The British Accounting Review*, Vol. 44(2), pp. 68-82, doi: 10.1016/j.bar.2012.03.004.
  23. Hiebl, M.R.W. (2023). Sample Selection in Systematic Literature Reviews of Management Research. *Organizational Research Methods*, Vol. 26(2), pp. 229-261, doi: 10.1177/1094428120986851.
  24. Hong, S., Van den Goor, G., Brinkkemper, S. (1993). *A formal approach to the comparison of object-oriented analysis and design methodologies*. Proceedings of the Twenty Sixth Annual Hawaii International Conference on Systems Sciences, t. X (pp. 689-698). Los Alamitos, CA: IEEE Computer Society Press.
  25. Hussinki, H., Ritala, P., Vanhala, M., Kianto, A. (2017). Intellectual capital, knowledge management practices and firm performance. *Journal of Intellectual Capital*, Vol. 18(4), pp. 904-922, doi:10.1108/jic-11-2016-0116.
  26. Kabuye, F., Alinda, K., Bugambiro, N., Kezaabu, S. (2021). Intellectual capital, isomorphic forces and internal controls over financial reporting in Ugandan microfinance institutions. *Cogent Business & Management*, Vol. 8(1), doi:10.1080/23311975.2021.1944960.
  27. Kostera, M. (2014). *Occupy Management. Inspiration and Ideas for Self-Organization and*

- Self-Management*. London: Routledge.
28. Kotarbiński, T. (1969). *Traktat o dobrej robocie*. Wrocław/Kraków: Ossolineum.
  29. Kowalczyk, B., Nogalski, B. (2007). *Zarządzanie wiedzą. Koncepcje i narzędzia*. Warszawa: Difin.
  30. Lev, B. (2001). *Intangibles, measurement and reporting*. Washington, D.C.: Brooking Institution Press.
  31. Marcinkowska, M. (2005). *Roczny raport z działań i wyników przedsiębiorstwa*. Kraków: Oficyna Ekonomiczna.
  32. Miśka, B., Pietruszka-Ortyl, A., Pocztowski, A. (2007). *Podstawy zarządzania przedsiębiorstwem w gospodarce opartej na wiedzy*. Warszawa: Difin.
  33. Mouritsen, J., & Roslender, R. (2009). Editorial: critical intellectual capital. *Critical Perspectives on Accounting*, Vol. 20(7), pp. 801-803, doi: 10.1016/j.cpa.2009.08.004.
  34. Oliveira, M., Curado, C., Balle, A.R., Kianto, A. (2020). Knowledge sharing, intellectual capital and organizational results in SMES: are they related? *Journal of Intellectual Capital*, Vol. 21(6), pp. 893-911, doi:10.1108/jic-04-2019-0077.
  35. Rabaya, A.J.R., Saleh, N.M., Hamzah, N. (2020). Intellectual Capital Performance and Firm Value: The Effect of MFRS 139. *The South East Asian Journal of Management*, Vol. 14(1), pp. 1-22, doi:10.21002/seam.v14i1.11851.
  36. Roos, J., Roos, G., Dragonetti, N.C., Edvinsson, L. (1997). *Intellectual Capital: Navigating in the New Business Landscape*. Macmillan.
  37. Sheikh, A.M. (2022). Green intellectual capital and social innovation: the nexus. *Journal of Intellectual Capital*, Vol. 23(6), pp. 1199-1220, doi: 10.1108/JIC-11-2020-0361.
  38. Simons, R. (1998). The role of management control system in creating competitive advantage: New Perspective. In: A.J. Berry, J. Broadbent, D.T. Otley (Eds.), *Management Control Theory* (pp. 173-194). Routledge.
  39. Sousa, W.V.C., Ribeiro, C., Rodriguez, M.V.R.Y. (2016). The contribution of intellectual capital management to minimize the hidden costs in public administration. *Sistemas & Gestao*, Vol. 11(3), pp. 326-341, doi: 10.20985/1980-5160.2016.v11n3.1204.
  40. Stoner, J.A.F., Wankel, Ch. (1997). *Kierowanie*. Warszawa: PWE.
  41. Sullivan, P.H. (2001). *Value-Driven Intellectual Capital: How to Convert Intangible Corporate Assets into Market Value*. New York: John-Wiley & Sons, Inc.
  42. Szczepankowski, P. (2010). Kontrola i controlling. In: W. Piotrowski, A.K. Koźmiński (Eds.), *Zarządzanie. Teoria i praktyka* (pp. 195-244). Warszawa: PWN.
  43. Tejedo-Romero, F., Araujo, J.F.F.E. (2020). The influence of corporate governance characteristics on human capital disclosure: the moderating role of managerial ownership. *Journal of Intellectual Capital*, Vol. 23, pp. 342-374, doi:10.1108/jic-03-2019-0055.
  44. Turyna, J. (2005). *Rachunkowość finansowa*. Warszawa: C.H. Beck.
  45. Ujwary-Gil, A. (2017). *Audyty zasobów niematerialnych z wykorzystaniem analizy sieci organizacyjnej*. Warszawa: PWN.

46. Urbanek, G. (2007). *Pomiar kapitału intelektualnego i aktywów niematerialnych przedsiębiorstwa*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
47. Wawrzyniak, B. (2003). *Zarządzanie wiedzą w przedsiębiorstwie*. WSPiZ im. L. Koźmińskiego.
48. Wirasedana, I.W.P., Sudarma, M., Andayani, W., Mulawarman, A.D. (2024). The role of capital in microfinance financial performance and cultural sustainability. *Cogent Business & Management*, Vol. 11(1), Retrieved from: <https://www.tandfonline.com/doi/full/10.1080/23311975.2023.2287770>.

## DETECTION OF DESTRUCTIVE EMOTIONS IN PROJECTS IMPLEMENTED IN THE OPEN SOURCE FORMULA

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**Purpose:** The aim of this paper is to present findings in automatic emotion detection in project management.

**Design/methodology/approach:** The approach adopted involves psychological literature review in area of destructive emotions. Then, an attempt was made to detect such emotions in text communication available in Open Source projects using neural networks. The neural network was trained to recognize basic emotions in text, based on available labeled training data. Then, the network trained in this way was used to recognize situations in which anger as an example of a destructive emotion, occurs in electronic communication regarding an Open Source projects.

**Findings:** The paper discusses three fundamental research questions that arise in the context of using machine learning methods to analyze emotions in projects. The first of them concerned what data can be used for analysis. It was established that electronic communication in projects implemented in the open source formula is publicly available and susceptible to text analysis. The second question concerned the methods that can be used in the analysis of emotions. Here it was established that machine learning methods may be useful due to the problems described in the literature with the use of dictionary methods. The third question concerned the existence of tools for use in detecting emotions. This is a question about whether machine learning methods are actually able to recognize emotions in real communication taking place in software projects.

**Research limitations/implications:** In the work, the analysis of the possibilities of automatic emotion detection in project management was presented. The focus was on detecting one type of emotion, namely "anger" as the most important from the point of view of project coherence. Further research may concern the detection of other emotions and their constellations.

**Originality/value:** The novelty of paper is an attempt to define a framework for the use of known methods of automatic emotion detection in project management.

**Keywords:** project management; emotion recognition; natural language processing.

**Category of the paper:** Conceptual paper.

## 1. Introduction

The current economy's projects are facing unique challenges and opportunities. Rapid technological progress provides opportunities for innovation and efficiency improvement. Activation of stakeholders is an important element of the life of the project, and electronic communication emotion analysis and emotion analysis proposes new tools for project management.

Electronic communications based on email are especially vulnerable to automatic analyses based on natural language processing. Many computer-based natural language processing methods (NLPs) are currently being developed. These are text and speech processing methods (Speech recognition, word segmentation), morphological analysis (Memory, Stemming), syntactic analysis (Parsing), semantic analysis (Sentiment Analysis with Emotional Recognition, Terminology Extraction), automatic summarization and machine translation. Emotions detections seems to be a particularly useful tool in Project Management. With such tools available, we can analyze internal sources of dangers in IT projects implemented in the open-source formula.

The aim of this study is to propose the use of automatic emotion detection in project management. It investigates the models used in psychological literature to describe destructive human emotions. Then, it proposes the use of neural networks to detect such emotions in text communication.

For the first time, Clarke's paper (2009) noted in the literature that projects are emotional. Awareness of this fact improves project management. Subsequent works, such as Whitty, S. (2010), have analyzed various artifacts related to projects and how they affect the project. However, such a fundamental element as communication has not been analyzed. Emerging new possibilities for analyzing emotions in texts (Nandwani, Verma, 2021), create new possibilities for creating new tools supporting project management. The complexity and multi-aspect nature of contemporary projects creates the need to enrich the Project Manager's instrumentation with new tools.

The work is divided into the following parts. The first section presents literature survey on topics of interest, namely open source projects, emotions models, destructive emotions, automated emotion recognition and IT tools for emotions analysis. The next part outlines the research questions. The next part describes communication data, the data for training emotions and the using neural networks in anger detection. Then we can find a discussion of the results obtained and findings. The whole paper ends with a summary.



## 2. Literature survey

### 2.1. Open source projects

Today, software development is a very complex project with many experts involved. One of the most effective methods of software development is open-source formulation. Open source software (OSS) is a computer software that is licensed by copyright holders to allow users to use, study, modify, and distribute software and its source code to anyone and for any purpose (Laurent, Andrew, 2008).

Some organizations which are follows open-source formula are the Linux Foundation, the Eclipse Foundation, home of the Eclipse software development platform, the Debian Project, creators of Debian GNU/Linux distribution; the Mozilla Foundation, home of the Firefox web browser and finally the Apache Software Foundation.

Mailing lists are the core means of project communication in open source projects, where they are used during software development and maintenance to discuss technical issues, propose changes, report bugs, or ask how-to questions about configuration or any other parts of the product (Obaidi, Klünder, 2021). The idea of using open source project mailing list communication to analysis originates from Tourani et al. (2014).

### 2.2. Emotions models

Clarke (2010) was probably the first who notice that projects are emotional. However, despite previous work on the significance of conflict in projects (Chen, 2006), and recognizing that conflict is a source of strong emotions (Barki, Hartwick, 2004), the topic of recognizing emotions in the project has not been considered in the literature on the subject. In mentioned paper Clark (2010) analyze how emotions affect project manager behaviors and decisions in order to better understand why projects go in very different directions to those expected within the predominant rationalist paradigm. He interviewed PMs who participated in emotional intelligence training, and they understood the importance of emotion in decision-making.

Virine et al. (2015) analyzed emotions in the context proposed by D. Goleman (Goleman, 2006) and adopted for project management by A. Mercino (Mercino, 2007) model of emotional intelligence. Proposed model analyse five domains: Self-awareness, Self-management, Social awareness, Relationship management and Team leadership. Virine et al. note that not only negative emotions may cause wrong decisions but also positive ones may cause mistakes. They propose several methods for handling emotions but their first step is always emotion recognition.

Human emotions are very complex phenomenon. For this reason, models of this phenomenon are considered in psychology. A fairly wide overview of the models can be found in (Nandwani, Verma, 2021). Most widely are used Ekman model (Ekman, 1992) and Plutchik Wheel of Emotions (Plutchik, 1980). Ekman model is categorical one, with six defined

emotions: anger, disgust, fear, joy, sadness, surprise. Plutchik considered two types of emotions. Basic ones which include Ekman six emotions supplemented by trust and anticipation and mixed emotions which are made from the combination of basic emotions. Plutchik represent his emotions on a colored wheel. Plutchik model is also categorical one. Opposite type of models are Dimensional Emotion models (Nandwani, Verma, 2021). They are based on three parameters: Valence (positive, neutral, negative), Activation or Arousal (excited, neutral, calm) and Dominance or Power (weak, neutral, strong).

### 2.3. Destructive emotions

In the context of project management, destructive emotions may be of particular importance. They can significantly impact team dynamics, decision-making, and consequently overall project success. A short catalog of such destructive emotions is presented below:

- **Anger:** Anger can arise from conflicts, unmet expectations, or stress. It can lead to hostility among team members, creating a toxic work environment and hindering collaboration. For these reasons, it is especially important to recognize these types of emotions (Hekkala, Stein, 2016; Wang, Chen et al., 2023).
- **Frustration:** Frustration often stems from obstacles or setbacks. It can result in decreased motivation and productivity, making it harder for teams to focus on goals. It is not that important but it affects the productivity of individual team members (Hartman, Jugdev, 1998; Jugdev et al., 2000).
- **Fear:** Fear of failure, criticism, or the unknown can inhibit creativity and risk-taking. Team members might avoid voicing ideas or addressing issues, which can stifle innovation. Such emotions reduce the creativity of the design team (Hartman, Jugdev, 1998; Jugdev et al., 2000).
- **Jealousy:** Jealousy can occur when individuals feel threatened by colleagues' success. This can damage relationships and foster competition instead of collaboration (Andiappan, Dufour, 2020).
- **Anxiety:** Anxiety about deadlines, performance, or the project's future can lead to decreased focus and increased stress levels, causing team members to struggle to perform at their best (Wang et al., 2021).
- **Despair:** A sense of hopelessness about project outcomes can lead to disengagement and lack of effort from team members, jeopardizing project timelines and quality (Potosky, Azan, 2023).

Project managers can employ several strategies to mitigate the impact of these destructive emotions on project success. Some of them are fostering open communication, setting clear goals, promoting a positive culture, encouraging reflection. In case of anger and frustration they can provide conflict resolution resources. They can equip the team with tools and techniques to resolve conflicts constructively. However, such support is based on recognizing the emotions occurring. Hence the importance of methods for recognizing destructive emotions.

## 2.4. Automated emotion recognition

Recent years have seen a strong development of computer natural language processing methods. After the first periods of Symbolic NLP (1950s - early 1990s), and Statistical NLP (1990s – 2010s), present NLP methods have huge potential for implementation. Natural Language Processing (NLP) refer to automated machine-driven algorithms for understanding of human language and extracting information (Dinov, 2018). Common tasks for these methods include text and speech processing, morphological analysis, syntactic analysis, lexical semantics, relational semantics, and discourse (Natural language processing, 2021). Some new applications includes: automatic summarization, machine translation, natural language generation. Very interesting directions of NLP development in the context of project management are the Sentiment Analysis (SA) and Emotion Analysis (EA) which leads to emotion recognition.

Automated emotion recognition use various methods like electroencephalogram (EEG), facial, and speech signals, text analysis. Current overview of trends and future perspectives can be found in paper (Maithri et al., 2022).

By the nature of things, emotion detection from text will be used to analyze emotions in open source projects where almost all communication takes place via mailing lists. We are talking about emotion detection here, narrowing down the area of emotion analysis. This lexical semantic approaches are founded on the belief that “it is possible to infer emotion properties from the emotion words” (D’Urso, Trentin, 1998).

Many papers have been written in recent years devoted to this topic. Worth mentioning are (Shivhareand, Khethawat, 2012) where Word Ontology was used and (Minu, Ezhilarasi, 2012) which describes an English emotion ontology based on WordNet. Batbaatar have used novel neural network architecture, called SENN (Semantic-Emotion Neural Network) which can utilize both semantic/syntactic and emotional information by adopting pre-trained word representations (Batbaatar et al., 2019). Ho et al. (2020) have used to analyse other than English language namely Vietnamese. Most recent surveys on emotion detection from text can be found in paper (Nandwani, Verma, 2021) and also in two papers which present utilization of deep learning models (Uymaz, Metin, 2022; Chen, 2022).

## 2.5. Tools for emotion recognition

There are two general ways for dealing with automatic emotion detection: knowledge-based techniques and statistical methods (Emotion recognition, 2023). Knowledge-based techniques are referred to as lexicon-based techniques but also contain rule-based systems. Statistical methods are based on the use of different supervised machine learning algorithms.

Emotion lexicons are dictionaries that associate words or phrases with specific emotions. Tools that can be used for emotion recognition are:

- NRC Word-Emotion Association Lexicon (Mohammad, Turney, 2010; Mohammad, Turney, 2013).
- WordNet (Princeton University, 2010).
- EmotiNet (Balahur et al., 2012).

Example of rule based system is ANEW (Affective Norms for English Words) (Bradley, Lang, 1999).

Statistical methods based on supervised machine learning algorithms use such architecture as:

- Convolutional neural network (CNN) (Wang et al., 2016).
- Bidirectional Encoder Representations from Transformers (BERT) and Bi-directional Long Short-Term Memory (BiLSTM) (Chen, 2022).

There are also effective hybrid methods, an overview of which can be found in (Alswaidan, Menai, 2020).

### 3. Research questions

When starting research in the selected area, one should be aware that the proposed models will have to be verified based on data from the real world. The question arises about the availability of such data, hence the first research question was formulated:

**RQ1:** What data from real projects can research be based?

Another problem that needs to be faced is the availability of methods and tools for detecting emotions. Their spectrum is quite extensive as discussed in the previous section. However, another research question arises in the form of:

**RQ2:** What methods can be used to analyze emotions in project management?

The last question that arises in the context of the considerations conducted is whether there are computer tools for automatic detection of emotions. Hence, the following research question was formulated:

**RQ3:** Are there any IT tools that can be used to detect emotions in electronic communications regarding Open Source projects?

This is a question about whether machine learning methods are actually able to recognize emotions in real communication taking place in software projects.

## 4. Materials and Methods

### 4.1. Communication data

Due to the specificity of projects in which teams are focused on achieving goals, it is difficult to expect that during their implementation someone will have time to answer surveys or undergo EEG tests. In this case, there is also a question about the relevance of the results of the research conducted in this way. This is especially important in the context of the use of surveys that need to be developed. We also resign from the use of facial analysis methods. It seems that at the initial stage of research it will be beneficial to focus on the analysis of texts and communication carried out in this form.

Communication in the project takes place in defined communication channels and is usually confidential. Fortunately, in IT projects implemented in the open source formula, the projects communication is based on mailing lists and by nature are publicly available.

The mailing list of the Apache OpenOffice project, implemented in the open-line formula, was selected in this work. For this, project communication is publicly available at "<https://openoffice.apache.org/mailling-lists.html>". Mailing list is maintained since 2011 till today. Every month, several hundred messages appear on all sub lists together.

Communication in the project is organized in 18 communication channels visible as thematic mailing lists. There are two groups of these lists: English Language Mailing Lists and Native Language (non-English) Mailing Lists. Among the last one are lists in German, Japanese, Italian and French. We will focus on English-language lists. Several of the most active lists are shown in Table 1. The last two mailing lists are not used for communication between stakeholders so they will be omitted.

**Table 1.**

*List of the most active English Language mailing list in period 2017-2022*

| Description                       | Adress                      | No of posts |              |
|-----------------------------------|-----------------------------|-------------|--------------|
|                                   |                             | total       | in year 2022 |
| Users Mailing List (Public)       | users@openoffice.apache.org | 7605        | 667          |
| Development Mailing List (Public) | dev@openoffice.apache.org   | 14301       | 1306         |
| Commits Mailing List              | none                        | 17095       | 2009         |
| Issues Mailing List               | none                        | 13357       | 839          |

Source: own elaboration.

OpenOffice is an open-source office suite. It was an open-sourced version of the earlier StarOffice, which Sun Microsystems acquired in 1999 for internal use. Sun open-sourced the OpenOffice suite in July 2000 as a competitor to Microsoft Office. In 2011, Oracle Corporation, then the owner of Sun, announced that it would no longer offer a commercial version of the suite and donated the project to the Apache Foundation. Apache renamed the software to Apache OpenOffice. Today the most actively developed successor projects is LibreOffice (OpenOffice.org, 2022).

## 4.2. The data with emotions

In 1990s, group of psychologists all over the world collected data in the ISEAR project, directed by Klaus R. Scherer and Harald Wallbott (1994). Student respondents, were asked to report situations in which they had experienced all of 7 major emotions. In each case, the questions covered the way they had appraised the situation and how they reacted. The final data set thus contained reports on seven emotions each by close to 3000 respondents in 37 countries on all 5 continents.

The result of this project is the ISEAR Dataset, which contains a labeled set of sentences. This is a collection of 7516 sentences labeled with 7 major emotions. (joy, fear, anger, sadness, disgust, shame, and guilt). This set was used to train a neural network to recognize major emotions.

## 4.3. The methods

The research was conducted based on the use of neural network methods. They were trained to classify typical emotions based on available sets describing emotions occurring in texts. Then, the network trained in this way will be used to recognize the emotion 'anger' in electronic communication in the project.

The use of neural networks will consist of the following stages:

- Defining the network architecture.
- Neural network training to classify the emotion "anger" in text based on the "ISEAR" Dataset.
- Using a Trained Neural Network to recognize "anger" emotions in mailing list communication.

Recognition of the "anger" emotion will consist in determining the similarity of the recognized text to texts from the ISEAR database that have been marked as containing the "anger" emotion. In this solution, the neural network plays the role of a binary classifier that determines the similarity of a given text, in this case an email, to a situation in which the 'anger' emotion was recognized.

When satisfactory results will be obtained, the trained network can be used to recognize the emotion of anger in communication within the OpenOffice project.

## 5. Discussion and findings

### The use of emotion recognition in project management

In the context of the latest views on the success of a project, according to which success is considered to be meeting the expectations of and stakeholders, their emotions may be important in the correct assessment of the project. We know that some negative emotions (such as anger) as well as positive ones (such as love) can affect the way we view the situation and the decisions we make. Hence, the ability to catch particularly bad emotions can be helpful in effectively managing stakeholder engagement. As a consequence, it can also have an impact on achieving project success more effectively.

For the above reasons, it seems justified to focus primarily on the detection of bad emotions, such as anger.

It was also established that there are IT tools that allow for recognizing the emotion of anger. Based on pre-trained neural networks, it is possible to identify emotions in the texts of emails sent in the project.

## 6. Summary

The presented work deals with the topic of using automatic emotion recognition in projects. On the one hand, can find effective tools for emotional analysis. On the other hand, it can be used to manage team dynamics.

The available data for the analysis of emotions in projects was reviewed. It turned out that it would be beneficial to use publicly available communication in open source projects. It also implied the use of methods of emotional analysis in texts. In the course of the conducted analyses, effective methods of analyzing emotions from the text were also reviewed. Finally, an analysis of the possibility of using emotion recognition in project management was made. The most beneficial seems to be the use of the proposed methods to detect destructive emotions that disturb the project team dynamics.

The main achievement is proposing a scheme for recognizing emotions in text communication occurring in projects implemented in the 'Open source' formula. The limitations of the method result from the fact that it is only applicable to projects in which communication takes place openly, as is the case in Open Source projects.

The presented work presents the concept of using emotion recognition in project management. The initial considerations carried out led to many further questions that need to be verified in empirical research. This will be the subject of further research.

## References

1. Alswaidan, N., Menai, M.E.B. (2020). A survey of state-of-the-art approaches for emotion recognition in text. *Knowledge and Information Systems, Vol. 62, Iss. 8*, pp. 2937-2987. doi:10.1007/s10115-020-01449-0
2. Andiappan, M., Dufour, L. (2020). Jealousy at work: A tripartite model. *Academy of Management Review, Vol. 45, Iss. 1*, pp. 205-229.
3. Balahur, A. Hermida, J.M., Montoyo, A. (2012). Detecting implicit expressions of emotion in text: A comparative analysis. *Decision Support Systems. Vol. 53, Iss. 4*, pp. 742-753. doi:10.1016/j.dss.2012.05.024.
4. Barki, H., Hartwick, J. (2004). Conceptualising the construct of interpersonal conflict, *International Journal of Conflict Management, Vol. 15, No. 3*, pp. 216-44.
5. Batbaatar, E., Li, M., Ryu, K.H. (2019). Semantic-Emotion Neural Network for Emotion Recognition From Text. *IEEE Access, Vol. 7*, pp. 111866-111878. doi: 10.1109/ACCESS.2019.2934529
6. Bradley, M.M., Lang, P.J. (1999). Affective norms for English words (ANEW): Instruction manual and affective ratings. *Technical Report C-1*. University of Florida: The Center for Research in Psychophysiology.
7. Chen, M.-H. (2006). Understanding the benefits and detriments of conflict on team creativity process. *Creativity and Innovation, Vol. 15, No. 1*, pp. 105-16.
8. Chen, M. (2022). Emotion Analysis Based on Deep Learning With Application to Research on Development of Western Culture. *Frontiers in Psychology, Vol. 13*, doi: 10.3389/fpsyg.2022.911686
9. Clarke, N. (2009). Projects are emotional: How project managers' emotional awareness can influence decisions and behaviours in projects, *Vol 3, Iss 4*, pp. 604-624, doi:10.1108/17538371011076073
10. D'Urso, V., Trentin, R. (1998). *Introduzione alla psicologia delle emozioni*. Laterza.
11. Dinov, I.D. (2018). Natural Language Processing/Text Mining. In: I.D. Dinov (ed.). *Data Science and Predictive Analytics: Biomedical and Health Applications Using R* (pp. 659-95). Cham: Springer International Publishing.
12. Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion, Vol. 6, Iss. 3-4*, pp. 169-200. doi:10.1080/02699939208411068.
13. *Emotion recognition* (2023). Wikipedia. Retrieved from: [https://en.wikipedia.org/w/index.php?title=Emotion\\_recognition&oldid=1153310432](https://en.wikipedia.org/w/index.php?title=Emotion_recognition&oldid=1153310432), 31.05.2023.
14. Goleman, D. (2006). *Emotional Intelligence. Why It Can Matter More Than IQ*. 10th Anniversary Edition. New York: Random House Publishing Group.



15. Hartman, F., Jugdev, K. (1998). *Leadership undertow: Project manager fears and frustrations*. Proceedings of the 29th Annual Project Management Institute Seminars and Symposium. Long Beach, USA.
16. Hekkala, R., Stein, M.-K. (2016). Silences and Voices of Fear, Anger, and Rationality: Emotionologies in an Information Systems Project. *Emotions and Organizational Governance, Research on Emotion in Organizations, Vol. 12*. Leeds: Emerald Group Publishing Limited, pp. 381-408. doi: 10.1108/S1746-979120160000012012
17. Ho, V.A., Nguyen, D.H.-C., Nguyen, D.H., Pham, L.T.-V., Nguyen, D.-V., Nguyen, K.V., and Nguyen, N.L.-T. (2020). Emotion Recognition for Vietnamese Social Media Text. In: L.-M. Nguyen, X.-H. Phan, K. Hasida, S. Tojo (Eds.), *Computational Linguistics* (pp. 319-333). Springer. Doi: 10.1007/978-981-15-6168-9\_27
18. Jugdev, K., Hartman, F., Thomas, J. (2000). Leadership fears and frustrations in project management. *Projects as Business Constituents and Guiding Motives*, pp. 183-192.
19. Maithri, M., Raghavendra, U., Gudigar, A., Samanth, J., Prabal Datta Barua, Murugappan, M., Chakole, Y., Acharya, U.R. (2022). Automated emotion recognition: Current trends and future perspectives. *Computer Methods and Programs in Biomedicine, Vol. 215*, pp. 106646. doi: 10.1016/j.cmpb.2022.106646
20. Mersino, A.C. (2007). *Emotional intelligence for project managers: The people skills you need to achieve outstanding results*. New York: American Management Association.
21. Minu, R.I., Ezhilarasi, R. (2012). Automatic Emotion Recognition and Classification. *Procedia Engineering, Vol. 38*, doi: 10.1016/j.proeng.2012.06.004
22. Mohammad, S.M., Turney, P.D. (2010). *Emotions Evoked by Common Words and Phrases: Using Mechanical Turk to Create an Emotion Lexicon*. Proceedings of the NAACL-HLT 2010 Workshop on Computational Approaches to Analysis and Generation of Emotion in Text. Los Angeles, pp. 26-34.
23. Mohammad, S., Turney, P. (2013). Crowdsourcing a Word-Emotion Association Lexicon. *Computational Intelligence, Vol. 29, Iss. 3*, pp. 436-465.
24. Nandwani, P., Verma, R. (2021). A review on sentiment analysis and emotion detection from text. *Social Network Analysis and Mining, Vol, 11, Iss. 1*, p. 81. doi:10.1007/s13278-021-00776-6
25. *Natural language processing*. Available online: [https://en.wikipedia.org/wiki/Natural\\_language\\_processing](https://en.wikipedia.org/wiki/Natural_language_processing), 31.05.2023.
26. Obaidi, M., Klünder, J. (2021) Development and Application of Sentiment Analysis Tools in Software Engineering: A Systematic Literature Review. *Evaluation and Assessment in Software Engineering*, pp. 80-89.
27. *OpenOffice.org*. Retrieved from: <https://en.wikipedia.org/wiki/OpenOffice.org>, 31.05.2023.

28. Plutchik, R. (1980). General Psychoevolutionary Theory of Emotion. In: R. Plutchik, H. Kellerman (Eds.), *Theories of Emotion* (pp. 3-33). Academic Press. doi:10.1016/B978-0-12-558701-3.50007-7
29. Potosky, D., Azan, W. (2023). Leadership behaviors and human agency in the valley of despair: A meta-framework for organizational change implementation. *Human resource management review*, Vol. 33, Iss.1, p. 100927.
30. Princeton University (2010). *About WordNet*. Princeton University. Retrieved from: <https://wordnet.princeton.edu/>, 31.05.2023.
31. Scherer, K.R., Wallbott, H.G. (1994). Evidence for universality and cultural variation of differential emotion response patterning: Correction. *Journal of Personality and Social Psychology*, Vol. 67, Iss. 1, p. 55. <https://doi.org/10.1037/0022-3514.67.1.55>
32. Shivhare, S.N., Khethawat, S. (2012). Emotion Detection from Text (arXiv:1205.4944). ArXiv. Retrieved from: <https://doi.org/10.48550/arXiv.1205.4944>, 17.05.2023.
33. Tourani, P., Yiang, Y., Adams, B. (2014). *Monitoring sentiment in open source mailing lists: exploratory study on the apache ecosystem*. Proceedings of 24th Annual International Conference on Computer Science and Software Engineering, CASCON'14, pp. 34-44.
34. Uymaz, A.H., Metin, K.S. (2022). Vector based sentiment and emotion analysis from text: A survey. *Engineering Applications of Artificial Intelligence*, Vol. 113, p. 104922. doi: 10.1016/j.engappai.2022.104922.
35. Virine, L., Trumper, M., Virine, E. (2015). Emotions in Project Management. *PM World Journal*, Vol. 4, Iss. 8, pp. 1-8.
36. Wang, L., Lin, H., Jiang, W. (2021). Effects of project leader workplace anxiety on project team member organizational citizenship behavior: A moderated mediation model. *Project Management Journal*, Vol. 52, Iss. 4, pp. 340-353.
37. Wang, Y., Feng, S., Wang, D., Yu, G., Zhang, Y. (2016). Multi-label chinese microblog emotion classification via convolutional neural network. In: Li, F., Shim, K., Zheng, K., Liu, G. (Eds.), *Web technologies and applications: APWeb 2016*, vol. 9931. Lecture notes in computer science. Cham: Springer, pp. 567-580.
38. Wang, W., Chen, X., Ning, G., Wang, Y., Song S. (2023). The relationship between anger and learning from failure: The moderating effect of resilience and project commitment. *Current Psychology*, Vol. 42, pp. 22726-22737. doi:10.1007/s12144-022-03330-5
39. Whitty, J.S. (2010). Project management artefacts and the emotions they evoke. *International Journal of Managing Projects in Business*, Vol. 3, Iss. 1, pp. 22-45.

## EMPLOYEE EXPERIENCE IN THE DEVELOPMENT SERVICES INDUSTRY IN POLAND

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**Purpose:** To increase knowledge about Employee Experience (EX) within the development services sector in Poland and the management of employee impressions in the workplace.

**Design/methodology/approach:** The research was conducted using a partial, ad-hoc diagnostic survey method based on a custom-designed questionnaire. The study was carried out with a purposive sampling method among organizations affiliated with the Polish Chamber of Training Firms (PIFS), focused on providing development services.

**Findings:** Respondents indicated that organizational culture plays a crucial role in shaping their overall experiences as employees in training companies. While the majority recognized that employee experience impacts customer experience, almost half had not yet formed an opinion on the creation of new HR roles, such as experience and sensation module designers. It was found that the surveyed training companies consider a variety of customer experiences when designing development services, with intellectual, emotional, and social experience modules being the most dominant. However, there is insufficient knowledge and experience regarding the experience market and EX within the development services industry in Poland.

**Research limitations/implications:** Due to the low response rate, generalization to the entire population is not possible. The conceptualization of EX in the development services sector requires further empirical diagnostic research.

**Practical implications:** The research findings may be useful for training company owners interested in the experience market and in managing both employee and customer impressions.

**Social implications:** Raising awareness of the experience market and highlighting the importance of the new EX paradigm in human capital management.

**Originality/value:** The article has cognitive value which contributes to the development of management and quality sciences, specifically in the area of human capital development.

**Keywords:** Experience Economy, Employee Experience, Employee Experience Management, Customer Experience, Development Services, Human Capital, Training.

**Category of the paper:** Research paper.

## 1. Introduction

The development of human resource management concept requires from management entities to redefine products and services provided to the staff and, simultaneously, to modernize and extend personal processes as well as the instrumental range (Lipka, 2024, p. 34). This type of changes may also refer to entities connected with human capital development, that is training companies. It appears that in the development services sector there should also be an EX-transformation, during which the focus point in human resource management would be transferred from the process described from the organization's perspective to experience, that is the employee's subjective perspective (cf. Lipka, 2024, p. 121).

Particular modules of employees' and clients' experiences should be in the center of interest of managers in charge of various industries, including the development services sector. For example, it is worth quoting from an interesting lecture "Brain during providing and receiving didactic classes", organized as part of International Congress on Education Quality: "Emotions are absolutely essential in business. Everything has an emotional context. You have to emotionally indulge the client. Emotions are critical in decision making" (Błaszak, 2024). It seems that in practice we do not always think in terms of the experience economy and we do not focus on the emotional, behavioral, or social modules of internal and external clients' experiences (employees and customers, respectively).

Impression management is therefore an interesting research problem. The purpose of the study is to determine whether training companies pay attention to the experience of trainees when designing development services? What modules (sensory, emotional, intellectual, behavioral and social) are present in training services designs? What is the awareness of people working in the development services industry in Poland with regard to the experience market and employee experience? How do they evaluate aspects such as physical space, technology used in the company, and organizational culture in shaping the overall employee experience.

The originality of the presented article results from the fact that employee experience in human resource management is currently being born, and employee experience economy which is its context, has not yet reached the stage of expansion or maturity, but still remains in the experimental stage (see Lipka, 2024, p. 14). Undertaking this topic in relations to training companies rendering various development services is certainly a novelty.

## 2. Literature Review

Recent literature has emphasized the need to consider the management of human capital in terms of the experience economy and from the perspective of impression management (Plaskoff, 2017; Gojtowska, 2019; Lipka, Król, 2021; Lipka, 2022, 2024; Bereś, 2022). The philosophy of human capital management has shifted from a customer-focused experience to a more employee-centered approach, oriented towards the absorption and immersion in experiences by employees, while they passively or actively participate in designing these experiences (Pine, Gilmore, 1998, 1999). A new category, *employee experience* (EX), has emerged (Panneerselvam, Balaraman, 2022; Malik, Budhwar, Mohan, Srikanth, 2022).

This topic has gained importance due to recent significant cultural, social, economic, and technological changes in contemporary organizations (more in: Molek-Winiarska, 2022). It is also linked to the employee lifecycle and involvement (Wilczyński, Kołoszycz, Karolewska-Szparaga, 2023), forming a new paradigm in human capital management.

The concept of experience within EX refers to the sum of employee experiences in interaction with various sensory, emotional, cognitive, behavioral, and relational factors during their work in a company (Maylett, Wride, 2017). The employee experience encompasses the range of engagements an employee encounters with various individuals, technology, procedures, and their physical or digital work environment. It includes both the minor aspects of daily tasks and occasional events or changes over time (Miles, 2023). The phenomenon occurs in the human mind as a result of external stimuli and is processed based on past experiences, mental needs, and individual strategies (Kacprzak, Dziwanowska, Skorek, 2015, p. 30).

Creating an excellent employee experience can lead to a transcendent customer experience (CX) (Maylett, Wride, 2019) and provide the company with a competitive advantage (Fulcher, Cote, Marasco, 2021; Hunt, 2022; Popelka, 2022). There is a lack of empirical research on employee experience management (Dębek, Ślęzyk-Sobol, 2016), where employees are treated as internal customers in the context of internal marketing (Abhari, Saad, Haron, 2008). The study of both Polish and foreign literature on the subject reveals significant gaps in the conceptualization of EX in the workplace environment (Morgan, 2017, 2019; Katzmayr, 2020; Yidiz, Temur, Beskese, Bozbura, 2020; Lipka, 2022; Molek-Winiarska, 2022; Whitter, 2022; Anzman, 2020; Lammer, 2023).

Both EX and CX concepts (see: Vilani, 2019; Kalbach, 2021) can be applied to the development services sector. For example, during the learning process, clients (training beneficiaries) may experience new phenomena, reflect on what has happened, conceptualize and draw conclusions, or experiment (Bereś, 2022, p. 118). The experience scale can range from a low (mediocre) level to a high (mastery) level (see: Bereś, 2022, p. 127). It is worth noting that in services, the role of employees in shaping customer experiences is fundamental.

### 3. Research Methodology and Characteristics of Respondents

For the purpose of the study, a custom survey questionnaire was constructed based on a literature review, consisting of 9 closed-ended questions (5 substantive, 4 demographic). The link to the questionnaire was made available via Google Forms. The tool was pilot-tested in July 2024, with the main study conducted in September 2024.

The survey was conducted using purposive sampling. The target group consisted of companies affiliated with the Polish Chamber of Training Firms (PIFS), whose main activity is the provision of development services. As of August 27, 2024, there were 373 institutions affiliated with PIFS (PIFS, 2024). These organizations were selected because they are characterized by high-quality services, adhering to the Code of Good Practices (PIFS, 2024), and their owners and employees are potentially more knowledgeable about new management concepts and approaches.

Due to legal regulations regarding data protection, email addresses could not be directly obtained from the largest company associating training companies in Poland (PIFS). In September 2024, the author contacted the companies by phone. The website contained only a publicly available list of company names, locations and voivodeships. While in possession of the data, the Author personally obtained 365 current email addresses, mainly from company websites and by searching for service providers in the Development Services Database (Development Services Database, 2024). Eight companies from the list had no available email addresses.

On September 12, 2024, 365 individual email invitations were sent to participate in the survey, six of which failed to reach their recipients due to technical issues. The messages received contained information such as “the message was not delivered to the address because the remote server is incorrectly configured”, “the message was not delivered because the recipient's address was not found or the recipient cannot receive the message”, “the address may be misspelled or may not exist”, “the message was not delivered to the recipient because the domain was not found”.

The survey form closed on September, 19 this year. Most responses were sent in the first days of the survey. 359 invitations were successfully delivered, 13 completed questionnaires were received, resulting in an response rate of 3.62%. The timing of the study coincided with a flood crisis in Poland, which prevented follow-up reminders or extension of the survey period. This result is lower than the 5% level characteristic of online and mail surveys (see: Szpunar, 2008, p. 45). This type of survey was consciously opted for due to its lower cost and budget constraints, as well as its shorter implementation time, also bearing in mind that there are certain limitations of survey research (such as self-selection of respondents, decreasing completion rates over a long period of survey implementation) (Maćik, 2005, pp. 108-109).

The respondents included 13 individuals (9 women, 4 men), with 10 business owners and 3 employees. The majority represented micro-enterprises (9) and small businesses (4). The vast majority provide both training and consulting services (10 responses), while the remaining ones offer solely training services (3 responses). Only one company engages in other, additional activities.

## 4. Results

### 4.1. Employee Experience – Managing Employee Impressions in the Polish Development Services Industry

Most respondents agreed with the statement that their company invests in creating positive experiences for its employees (see Table 1).

**Table 1.**

*The structure of responses to the question: “Does your company invest in creating positive experiences for its employees?”*

| Response options           | Number of responses |
|----------------------------|---------------------|
| Agree                      | 7                   |
| Partially agree            | 4                   |
| Neither agree nor disagree | 2                   |
| Partially disagree         | 0                   |
| Disagree                   | 0                   |

Source: Own elaboration based on own empirical research.

*Employee experience* refers to how employees feel about what they encounter and observe while performing their professional duties (First Steps with Employee Experience, 2024). This experience relates to three aspects: the physical space, the technology used in the company, and the organization's culture (Morgan, 2017, 2019). In the study, respondents evaluated the importance of these aspects in shaping their overall experiences as employees of a given company (see Table 2).

**Table 2.**

*The structure of responses to the question related to the importance of aspects in shaping overall employee experiences in a given company*

|                                | No importance | Low | Average | High | Very high |
|--------------------------------|---------------|-----|---------|------|-----------|
| Physical space                 | 2             | 0   | 1       | 5    | 5         |
| Technology used in the company | 0             | 0   | 1       | 7    | 5         |
| Organizational culture         | 0             | 0   | 1       | 4    | 8         |

Source: Own elaboration based on own empirical research.

Table 2 shows that according to the respondents, organizational culture is of great importance, and technology used in the company also holds significant importance (see Shivakumar, 2020). Subsequently, respondents were asked to respond to three statements and indicate to what extent they agree with them (see Table 3).

**Table 3.**

*The structure of responses to the question: "To what extent do you agree with the following statements?"*

|  | Disagree | Partially disagree | Neither agree nor disagree | Partially agree | Agree |
|--|----------|--------------------|----------------------------|-----------------|-------|
| Employee experience in our company impacts the customer experience.  | 1        | 0                  | 0                          | 2               | 10    |
| Due to the growing importance of the experience market, it is essential to designate an experience and sensation module designer within the HR team. | 2        | 0                  | 6                          | 1               | 4     |
| Managing employee impressions in the Polish development services industry is an important issue.   | 0        | 0                  | 3                          | 3               | 7     |

Source: Own elaboration based on own empirical research.

It turned out that, according to respondents, managing employee impressions in the Polish development services industry is considered an important issue, and employee experience influences customer experience. However, nearly half of the respondents do not have a clear opinion regarding the creation of new HR roles, such as experience and sensation module designers, which stems from the assertion that "it is necessary – due to the increasingly crystallizing experience market – to create new HR roles: experience and sensation module designers" (Lipka, 2022, p. 171).

In a subsequent question, respondents assessed the impressions left by their company's activities among employees and customers. It is noteworthy that they rated the impressions among customers higher ("very good" – 9 responses, "good" – 4 responses) than those among employees ("very good" – 6 responses, "good" – 7). Perhaps they prioritize customers over employees, which is contrary to the EX concept (see: Tetzlaff, McLeod, 2016).

#### **4.2. Experience Modules Among Customers of Development Services**

The study also asked to what extent companies provide tailored services that stimulate/shape specific types of experiences for customers (see Table 4). The following experience and sensation modules were identified:

- Sensory module, for example with visual, auditory, taste, olfactory, and tactile stimuli (Lipka, 2022, p. 17),
- Emotional module, where experiencing various emotions (both success in acquiring new competencies and failure in helplessness while facing challenges disproportionate to one's skills and abilities) is embedded in the employee training process. Learning



itself is defined as an iterative process of modifying prior experiences, i.e., their transformation (Kolb, 1997, pp. 138-156, cited in: Lipka, 2022, p. 61).

- Intellectual module, forming a fundamental component of learning processes. Cognitive processes occur during an active learning approach, i.e. learning through discovery; mastery training; guided exploration; analogical transfer or adaptive transfer (Łaguna, 2010, p. 138, cited in: Lipka, 2022, p. 81).
- Behavioral module, with specific actions and behaviors designed. This module may use performative utterances (e.g., learn, accept a challenge, develop your skills, participate in training, use e-learning, improve your competencies) (more in: Lipka, 2022, pp. 111-112).
- Social module, which focuses on relational experiences and sensations (Lipka, 2022, p. 131). For example, it takes into account the benefits of networking and organizing cohort-based courses.

**Table 4.**

*The structure of responses to the question: "To what extent does your company provide tailored services that stimulate/shape the following types of experiences for customers?"*

| Experience modules | Small extent | Fairly small extent | Medium extent | Large extent | Very large extent |
|--------------------|--------------|---------------------|---------------|--------------|-------------------|
| Sensory            | 1            | 2                   | 4             | 3            | 3                 |
| Emotional          | 0            | 2                   | 0             | 6            | 5                 |
| Intellectual       | 0            | 0                   | 0             | 7            | 6                 |
| Behavioral         | 0            | 2                   | 3             | 3            | 5                 |
| Social             | 0            | 2                   | 1             | 3            | 7                 |

Source: Own elaboration based on own empirical research.

Table 4 shows that services strongly shape relational modules for customers and to a large extent - intellectual modules. If we sum up the affirmative responses ("large" and "very large" extent), the dominant experience modules are intellectual, emotional, and social.

## 5. Discussion

The research findings are relevant because they helped determine that the development services sector invests in building positive employee experiences, and the organizational culture plays an important role in their shaping. Employees' experience in that sector impacts the clients experience in the development services. The current findings are connected with the previous findings which said that positive employee experience results in appropriate customer experience which leads to retention of existing clients, acquisition of new clients from recommendation, cross-sales. Interestingly, in the long term appropriate EX allows for the return on own capital investment exceeding competitors performance by 2.3-3.8% annually (Smit, Vestergaard, Henriksen, 2020, p. 17).

Impressions left by training companies operations among clients were assessed better than those concerning employees. It seems that those companies should take better care of holistic human-centered design (Gustaffson, Caruelle, Bowen, 2024, pp. 333-356). The development services sector should be considered in terms of experiences market of both employees and clients. It is important to embark on experiences of various degrees of differentiation, characterized by immateriality, elusiveness, loftiness, subjective perception and evaluation (cf. Pine, Gilmore, 2020).

As A. Lipka emphasizes employee experiences impact client experiences and vice versa, which is connected with the theory of affective infection (Wróbel, 2016; after: Lipka, 2024, p. 122). There is an evolution of personal function model in the direction of omni-experience model, in which an individual absorbs experiences of sensory, emotional, intellectual, behavioral, relational nature in order to collect experiences and build on that basis (Lipka, 2024, p. 122).

This research may initiate the acceptance of the omni-experience model in the development services sector and the need to explore the following key issues: employee journey (EJ), employee lifecycle (EL), employee touchpoint (ET), employee moments of truth (eMOTS), employee friction points (EFPs) (cf. Lipka, 2024, pp. 35-37).

## 6. Conclusion

The study was exploratory in nature. Challenges were encountered in obtaining a representative response. Due to the low response rate, generalization to the entire population is not possible. It became clear that for the measurement of employee experience to have real cognitive and practical value, it should be supplemented with qualitative methods, as employee experience is a multidimensional construct (see Dębek, Ślęzyk-Sobol, 2016, p. 77). An attempt to gather expert opinions and comments from experts, key industry representatives was made on the final day of the quantitative survey by inviting members of the Council for the Development Services Sector Competence (Council Members, 2024), but unfortunately, no responses were received.

It appears that employee experience in the development services industry also requires time, commitment, and openness to change (Komorowska, 2024). The empirical diagnosis of the EX research area in the development services industry requires continuation and extension. This research concludes that training companies, when designing development services, do not equally consider various sources of employee experiences. An important reason for this may be their insufficient knowledge and expertise concerning the experience market and EX. Organizational culture can play a very important role in shaping their overall experiences as employees of a given company.

To emphasize the new research finding, it should be noted that among customers of development services, intellectual as well as emotional and social modules are significantly shaped. A similar trend can be observed in educational institutions, some of which are introducing innovative solutions in the field of relational education (see: Hausner, Jelonek, 2022).

The conclusions obtained from the study have both theoretical and practical implications. The article draws attention to the new EX paradigm in human capital management and presents the development services sector in the context of the experience economy, thus extending theoretical knowledge in this area. As a result, it becomes necessary to include the concept of Employee Experience Management in future research. The article can serve as an inspiration for owners of training companies who want to look at problems in the organisation not only from a business perspective but also from an employee perspective, those who are interested in enhancing work organisation and streamlining activities towards employees, as well as improving the quality of employee and customer experiences (see: Wojciechowska, 2023), who want to manage interdependent customer and employee experiences (Urbański, Dziewa, 2023, p. 148).

According to the author, a paradigm shift is occurring in the development of human capital in the context of the evolution from the training market to the experience market. Shaping experiences for both employees and customers is becoming crucial. This means that when designing specific training investments, sensory, emotional, intellectual, behavioral, and social experience modules should be considered (more in: Winnicka-Wejs, 2024, pp. 150-151).

## References

1. Abhari, K., Saad, N.M., Haron, M.S. (2008). *Enhancing Service Experience through Understanding: Employee Experience Management*. International Seminar on Optimizing Business Research and Information. Jakarta, Indonesia: Binus University.
2. Anzman, M. (2020). *The Employee Experience Solution: Transform Employee Engagement, Improve Workplace Culture, and Drive Results*. Melissa Anzman Enterprises, p. 264.
3. *Baza Usług Rozwojowych*. Retrieved from: <https://uslugirozwojowe.parp.gov.pl/>, 6.09.2024.
4. Bereś, A. (2022). *Pracodawca wszechdoświadczalny. Employee experience po prostu*. Novae Res.
5. Błaszak, M. (2024). *Mózg podczas prowadzenia i odbioru zajęć dydaktycznych*. International Congress on Education Quality, Katowice, 25.10.2024.

6. Dębek, M., Ślazyk-Sobol, M. (2016). Zarządzanie doświadczeniami pracowniczymi: fundamenty teoretyczno-metodyczne. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu. Sukces w zarządzaniu kadrami. Dylematy zarządzania kadrami w organizacjach krajowych i międzynarodowych. Problemy zarządczo-psychologiczne, No. 430*, pp. 69-82.
7. Fulcher, J., Cote, T., Marasco, K. (2021). *People Operations: Automate HR, Design a Great Employee Experience, and Unleash Your Workforce*. Wiley, p. 272.
8. Gojtowska, M. (2019). *Candidate experience. Jeszcze kandydat czy już klient?* Warszawa: Wolters Kluwer.
9. Gustafsson, A., Caruelle, D., Bowen, D.E. (2024). Customer experience (CX), employee experience (EX) and human experience (HX): introductions, interactions and interdisciplinary implications. *Journal of Service Management, 35(3)*, pp. 333-356.
10. Hausner, J., Jelonek, M. (2022). *Szkoły poza horyzont 2*. Kraków : Fundacja Gospodarki i Administracji Publicznej, p. 348.
11. Hunt, S.T. (2022). *Talent tectonics: navigating global workforce shifts, building resilient organizations, and reimagining the employee experience*. Hoboken, New Jersey: Wiley, p. 320.
12. Kacprzak, A., Dziewanowska, K., Skorek, M. (2015). *Gospodarka doświadczeń. Perspektywa polskiego konsumenta*. Warszawa: PWN, p. 268.
13. Kalbach, J. (2021). *Mapping experiences: a guide to creating value through journeys, blueprints and diagram*. Sebastopol, California: O'Reilly, p. 379.
14. Katzmayr, M. (2020). *Employee Experience as a new strategic approach to people Management to enhance competitiveness*. Linz: Johannes Kepler University.
15. *Kodeks Dobrych Praktyk PIFS*. Retrieved from: <https://pifs.org.pl/#jakosc>, 28.08.2024.
16. Kolb, D.A. (1997). The process of experiential learning. In: M. Thorpe, R. Edwards, A. Hanson (Ed.), *Culture and Process of Adult Learning* (pp. 138-156). London: Routledge.
17. Komorowska, K. (2024). Employee experience wymaga czasu, zaangażowania i otwartości na zmiany. *Puls Biznesu, no. 41*, p. III, 27.02.2024.
18. Łaguna, M. (2010). Nowe tendencje w podejściu do szkoleń w organizacji. In: A.M. Zawadzka (Ed.), *Psychologia zarządzania w organizacji* (p. 138). Warszawa: PWN.
19. Lammer, M. (2023). *Employee Experience. sechs Schritten zum besten Arbeitgeber*. Oeynhausen: Impressum.
20. Lipka, A. (2022). *Employee Experience. Zarządzanie kapitałem ludzkim w kategoriach rynku doznań*. Warszawa: PWE, p. 225.
21. Lipka, A. (2023). Employee Experience Models - a Comparative Analysis. Notes on the Methodology of Global Research on Employees' Experiences and Their Perceptions of the Meaning of Work. *Acta Universitatis Lodzianis. Folia Oeconomica, vol. 3, no. 364*, pp. 51-75.

22. Lipka, A. (2024). *Employee experience management jako perspektywa rozwoju zarządzania zasobami ludzkimi w czasach ekonomii doświadczeń. Inspiracje z customer experience management*. Warszawa: PWE, p. 156.
23. Lipka, A., Król, M. (2021). *Rynek doznań. Moduły doświadczeń podczas tworzenia i percepcji ilustracji*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego, p. 150.
24. *Lista członków PIFS*. Retrieved from: <https://pifs.org.pl/#dolacz>, 27.08.2024.
25. Mącik, R. (2005). *Wykorzystanie Internetu w badaniach marketingowych*. Lublin: UMCS.
26. Malik, A., Budhwar, P., Mohan, H., Srikanth, N. (2022). Employee experience –the missing link for engaging employees: Insights from an MNE’s AI-based HR ecosystem. *Human Resource Management, Vol. 62, No. 1*, pp. 97-115.
27. Maylett, T., Wride, M. (2017). *The Employee Experience: How do Attract Talent, Retain Top Performers and Drive Results*. Hoboken: John Wiley and Sons.
28. Maylett, T., Wride, M. (2019). *Employee Experience*. Findaway Word.
29. Miles, M. (2023). *What is employee experience (EX) and why does it matter?* Retrieved from: <https://www.betterup.com/blog/employee-experience>, 29.09.2023.
30. Molek-Winiarska, D. (Ed.) (2022). *Shaping employee experience in the changing social and organisational conditions*. Wrocław: Publishing House of Wrocław University of Economics and Business, p. 106.
31. Morgan, J. (2017). *The Employee Experience Advantage: How to Win the War for Talent by Giving Employees the Workspaces they Want, the Tools they Need and they Culture they Can Celebrate*. New Jersey: John Wiley and Sons.
32. Morgan, J. (2019). *Employee Experience Advantage*. Findaway Word.
33. Panneerselvam, S., Balaraman, K. (2022). Employee experience: the new employee value proposition. *Strategic HR Review, Vol. 21, No. 6*, pp. 201-207.
34. *Pierwsze kroki z Employee Experience – czym jest, dlaczego warto i czy to coś dla Ciebie?* Retrieved from: <https://generatorpomyslow.pl/pierwsze-kroki-z-employee-experience-czym-jest-dlaczego-warto-i-czy-to-cos-dla-ciebie/>, 5.09.2024.
35. Pine, B.J., Gilmore, J.H. (1998). Welcome to the experience economy. *Harvard Business Review, no. 76(4)*, pp. 173-177.
36. Pine, B.J., Gilmore, J.H. (1999). *The Experience Economy: Work is Theater and Every Business a Stage*. Boston: Harvard Business School Press.
37. Pine, B.J., Gilmore, J.H. (2020). *The Experience Economy: With a New Preface by the Authors: Competing for Customers Time, Attention, and Money*. Boston: Harvard Business School Press.
38. Plaskoff, J. (2017). Employee experience: the new human resource management approach. *Strategic HR Review, Vol. 16, No. 3*, pp. 136-141.
39. Popelka, J. (2022). *Experience, inc: why companies that uncover purpose, create connection, and celebrate their people will triumph*. Hoboken, New Jersey: Wiley, p. 243.

40. Shivakumar, S.K. (2020). *Build a Next-Generation Digital Workplace: Transform Legacy Intranets to Employee Experience Platforms*. Berkeley: Apress, p. 365.
41. Smit, S., Vestergaard, T., Henriksen, M. (2020). *Mastering Employee Experience. 16 specific steps to take in your EX transformation*. København: Spintype.
42. Szpunar, M. (2008). Jak zwiększać odsetek wypełnień w badaniu internetowym – fakty i mity na temat kwestionariuszy on-line. *Studia Medioznawcze*, 1(32), pp. 42-54.
43. Tetzlaff, S., McLeod, J. (2016). *Employee experience: a capstone guide to peak performance*. Minneapolis, Minnesota: North Loop Books, p. 214.
44. Urbański, A., Dziewa, L. (2023). *Tworzenie doświadczeń klientów*. Gliwice: Helion.
45. Vilani, I. (2019). *Transform customer experience: how to achieve customer success and create exceptional CX*. Milton, Queensland: Wiley.
46. Whitter, B. (2022). *Employee Experience: Develop a Happy, Productive and Supported Workforce for Exceptional Individual and Business Performance*. Kogan Page, p. 216.
47. Wilczyński, A., Kołoszycz, E., Karolewska-Szparaga, M. (2023). Cykl życia pracownika w organizacji z uwzględnieniem koncepcji doświadczenia pracownika i zaangażowania. *Kwartalnik Nauk o Przedsiębiorstwie*, 68(2), pp. 123-135.
48. Winnicka-Wejs, A. (2024). *Inwestycje szkoleniowe w kapitał ludzki*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego w Katowicach, p. 216.
49. Wojciechowska, K. (2023). *Customer Experience Management. Moc pozytywnych doświadczeń na ścieżce Twojego klienta*. Gliwice: Helion.
50. Wróbel, M. (2016). *Zarażanie afektywne. O procesie transferu emocji i nastroju między ludźmi*. Warszawa: PWN.
51. Yidiz, D., Temur, G.T., Beskese, A., Bozbura, F.F. (2020). Evaluation of positive employee experience using hesitant fuzzy analytic hierarchy process. *Journal of Intelligent and Fuzzy Systems*, vol. 38(1), pp. 1043-1058.

## AI CUSTOMER CARE IMPLEMENTATION IN THE HEALTH AND WELL-BEING MARKET AS A DYNAMIC MARKETING CAPABILITY

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**Purpose:** The paper shows the Artificial Intelligence (AI) company implementation process aimed at improving customer care, which is treated as an exemplification of crafting dynamic marketing capabilities.

**Design/methodology/approach:** The study employs case study analysis, focusing on Philips in the health and well-being market.

**Findings:** The paper provides Philips' AI integration process in customer care, emphasizing the use of GPT models and Retrieval Augmented Generation (RAG) to customize AI responses with company-specific data.

**Research limitations/implications:** Future research should explore AI's impact on other industries, incorporating quantitative financial and operational outcomes analysis. Longitudinal studies should assess how AI strategies evolve. Key areas for further investigation include ethical and privacy issues, AI implementation in small and medium enterprises (SMEs), and cross-cultural contexts. The research's limitations include its single case study focus, lack of quantitative data, and short-term AI adoption analysis.

**Practical implications:** AI tools, such as chatbots, can improve customer care efficiency, accuracy, and speed, reducing agent workload and enhancing consumer experiences. For Philips, AI integration in customer care leads to increased consumer satisfaction and loyalty. AI streamlines customer service, reduces operational costs, and allows businesses to scale support without proportional staffing increases, driving profitability and strengthening market positioning. However, human supervision remains critical to ensure accuracy and prevent AI-generated errors, while privacy safeguards must be in place to protect data.

**Originality/value:** The study highlights AI's transformative role in helping businesses navigate market complexities and the use of new technology in improving customer care processes.

**Keywords:** artificial intelligence, customer care, dynamic marketing capability, the health and well-being market.

**Category of the paper:** case study.

## 1. Introduction

The observed rapid growth in the utilization of Artificial Intelligence (AI) across an increasingly broad spectrum of business activities has rendered it an attractive research subject. It is now challenging to identify a functional area within an enterprise where processes are not, to some extent, supported by AI solutions. The scope and speed of AI's applicability vary across different management domains. The rate at which new AI applications emerge in business appears to be a function of the potential for optimising processes primarily aimed at cost reduction or increasing revenue/profitability. Consequently, the greatest commercialisation of AI solutions is observed in business processes where optimisation leverages positive outcomes in both cost and revenue management within ongoing operations.

One of the functional areas where AI implementation is most dynamic - and which also appears to be one of the greatest beneficiaries of AI solutions - is marketing. Marketing processes that are intensively supported by AI include (Kumar et al., 2024; Peyravi et al., 2020; Jarek, Mazurek, 2019):

- content personalization - analysing user data and recommending products or content that may interest them,
- Big Data analysis - analysing large datasets from various sources to identify trends, customer behaviour patterns, and market segmentation,
- sentiment analysis - analysing data from social media, reviews, and other sources to understand the emotions evoked by specific products or brands in customers,
- marketing automation - assessing potential customers based on various criteria (e.g., website activity, social media engagement) to identify the most valuable customers and manage email campaigns, delivering appropriate content at the right times, depending on the customer's stage in the journey,
- content creation - social media posts, product descriptions, and other marketing content,
- SEO optimization - analysing search data, recommending optimal keywords, content structure, and linking strategies,
- ad targeting - analysing user behaviour to enhance the effectiveness of advertising campaigns and optimize ad spending, thereby allocating budgets in a way that maximizes return on investment,
- consumer behaviour prediction - forecasting future consumer behaviours to better plan marketing and sales activities,
- cohort analysis - analysing the behaviour of different customer groups to understand how various marketing activities influence customer loyalty and engagement,
- competitor monitoring and analysis - real-time monitoring of competitors' actions, such as advertising campaigns, allowing for better adaptation of one's marketing strategies,



- social media marketing - automating the posting of content across different social media platforms, tailored to the platform's specific characteristics and users,
- customer journey optimization - mapping the customer journey based on data on customer interactions with the brand at various stages of the purchasing process, enabling the identification of critical points and optimization of customer experiences,
- chatbots and virtual assistants - automating responses to customer queries, solving problems, and assisting with online shopping.

The application of AI in marketing allows for more precise, customized approaches to meet individual customer needs, resulting in higher customer engagement and the optimization of management processes.

The observed scope of AI use in marketing suggests that a key element in building a competitive advantage will be an organization's ability to harness AI's potential to identify, create, and embed new, effective marketing routines that contribute to building dynamic marketing capabilities. At this stage, the beneficiaries of AI in marketing are large international companies with sufficient resources, where even relatively small gains from marketing process optimization through AI can generate significant benefits due to the volume of transactions and scale of operations. Increasing AI use allows these large enterprises to strengthen their competitive advantage by enhancing the effectiveness and efficiency of their activities.

Therefore, most current research is exploratory, focusing on identifying the extent and areas of AI use by large companies. At this stage, AI implementation in marketing activities primarily employs qualitative methods (case studies, participant observation), where research efforts are concentrated on exploring the phenomenon, describing the scope of AI use within specific organizations, and outlining the challenges and barriers to AI implementation, in the search for new, effective marketing routines aimed at creating new competencies that, in the long term, will form the basis for building dynamic marketing capabilities that sustain a competitive advantage in the market.

The purpose of this article is to review customer care practices in the area of AI utilization as a foundation for exploring examples of building dynamic marketing capabilities aimed at enhancing business efficiency and creating a competitive advantage for organizations focused on meeting consumer needs.

The area of investigation for dynamic marketing capabilities is the health and well-being market, as an example of a consumer-centric business, with Philips company serving as the subject of analysis. The case study method (Fidel, 1984; Yin, 1984; Thomas, 2011) was employed to analyse the collected material. The article consists of two main sections.

The first discusses the concept of dynamic marketing capabilities from the perspective of AI technology's potential to create new marketing routines and practices in customer care specifically.

The second part presents the results of exploring Philips' AI-related customer care practices, describing the process of AI adaptation and implementation. The analysis of actions adopts a retrospective approach to AI implementation, discussing the early stages of adoption and the evolution of AI use in Philips' customer care.

The article concludes with a diagnosis of the research limitation, benefits and risks associated with using AI as an effective tool for building new customer care routines, which in the future have the potential to create dynamic marketing capabilities that will underpin Philips' competitive advantage in the health and well-being market.

## **2. AI as a catalyst for creating new marketing capabilities in the health and well-being market**

In the context of the development of scientific theory within strategic management, the concept of dynamic marketing capabilities (DMC) represents one of the areas of research within the broader framework of organizational dynamic capabilities (DC) (Mohamud, Sarpong, 2016). Dynamic capabilities refer to specific, learned routines or practices that are systematically employed by organizations to continuously adapt their resources and capabilities to environmental changes. These learned routines, however, are not permanent; their replication period is time-bound and does not guarantee a sustained competitive advantage. The necessity for continuous adaptation of these routines is driven by two primary factors: the turbulent environment (Kogut, Zander, 1992) and the rapid imitation of solutions or routines by competitors. Organizations must therefore be capable of adapting to changes in every aspect of management (reorganization of resources), including the continuous adaptation of developed routines/practices that enable the organization to survive and thrive. This leads to the fundamental assumption of dynamic capabilities: the organization's acceptance of strategic change, which involves the continuous pursuit of new, rare resources and capabilities, as well as new combinations of resources and capabilities that allow the organization to quickly adapt to changing environmental conditions.

In the process of seeking new combinations of resources and competencies, the acquisition of information from the environment and the organization's ability to swiftly utilize this information, as well as to create new or modify existing routines/practices, play a crucial role. Therefore, the organization must be open to acquiring data from its environment and possess the internal capacity to quickly implement changes that address the challenges identified in the environment. The scope of information acquisition is continuously expanding due to the increasing number of interdependent organizations involved in delivering increasingly complex value propositions to a wide range of stakeholders (customers, investors, local communities). The complexity of the environment, along with the dynamics of the changes within it, means

that every area within the organization could be a source of opportunity or threat to the company's market position. Consequently, there is a need for the enterprise to be permanently oriented towards creating dynamic capabilities for building an appropriate composition of resources and organizational capabilities at every level of the company's organizational or functional structure, including in the area of marketing activities (Witczak, 2018; Witczak, Narimanfar, 2022).

Emerging definitions of dynamic marketing capabilities (DMC) highlight the functional area of the company's marketing activities, including marketing mix instruments, where routines/practices are created based on the existing marketing resources and competencies. Within this convention, DMC are defined as the creation of competencies in the functional domain, that is, by increasing the effectiveness and efficiency of the organization's classic marketing instruments (product, price, distribution, and promotion). Therefore, dynamic marketing capabilities are oriented towards acquiring and reconstructing resources to change marketing routines, which are difficult for competitors to imitate, thereby leading to the achievement of a competitive advantage (Konwar et al., 2017).

DMC refers to the effectiveness of a bundle of interrelated routines/practices that support the organization's ability to engage in specific marketing activities and respond to changes in market conditions (Kamboj, Rahman, 2015; Ngo, O'Cass, 2012). In this context, dynamic marketing capabilities reflect the shaping of managerial capabilities, including human capital, social capital, and cognitive processes of managers involved in creating, utilizing, and integrating market knowledge and marketing resources to adapt to and create market and technological changes (Bruni, Verona, 2009). The key term in this definition of DMC is market knowledge, which reflects the knowledge about customers and competitors as a domain for creating effective routines/practices through the use of tangible (products, distribution channels) and intangible (brand) marketing resources. Combining these two approaches – functional and competency/managerial – dynamic marketing capabilities can be defined as a set of learned, repeatable practices aimed at systematically creating, evaluating, and reconfiguring the organization's resources and capabilities to create routines that allow marketing activities to be adapted to changing market conditions, ultimately leading to a competitive advantage (Mitreğa, 2016; Dias, Pereira, 2017).

As a result, dynamic marketing capabilities are increasingly sought in the utilization of AI in marketing processes (Pfajfar et al., 2024; Manis, Madhavaram, 2023; Abou-Foul et al., 2002; Wang, 2013). Researchers are particularly interested in learned, repeatable practices that leverage AI (e.g., AI chatbots in call centres, user-generated content, new product development) to systematically create, evaluate, and reconfigure the organization's resources and capabilities, thereby creating innovative routines (through the use of AI) that enable the organization to better adapt its marketing activities to changing market conditions compared to its competitors.

AI implementation is becoming increasingly crucial for companies operating especially in the health and well-being market. These encompass operational efficiencies and the potential to improve patient outcomes, consumer experiences, and overall customer care innovation in the industry. Below is a detailed explanation of why AI is vital in this market (Alhashmi, 2020; Abou-Foul et al., 2022; Kumar, Joshi, 2022):

- customized treatments: AI can analyse vast datasets of patient information, including genetic data, medical history, and lifestyle choices, to develop personalized treatment plans. This approach, known as precision medicine, is particularly valuable in treating conditions like cancer, where therapies can be tailored to the genetic profile of the tumour;
- predictive analytics: AI can predict potential health issues before they manifest, allowing for early intervention. For instance, AI algorithms can analyse patterns in patient data to predict the likelihood of chronic diseases such as diabetes or heart disease, enabling preventative care measures;
- enhanced imaging analysis: AI-powered tools can process medical images (such as X-rays scans) with high accuracy, often surpassing human capabilities. These tools can detect abnormalities like tumours, fractures, or other conditions at an early stage, leading to timely and accurate diagnosis. By assisting or automating diagnostic processes, AI reduces the potential for human error, which is critical in fields like radiology and pathology, where misdiagnosis can have serious consequences;
- accelerated research: AI algorithms can process and analyse vast amounts of biomedical data to identify potential drug candidates faster than traditional methods. This can significantly reduce the time and cost associated with bringing new drugs and equipment to market.
- automated administrative tasks: AI can streamline administrative processes, such as patient scheduling, billing, and claims processing. This automation reduces the workload on staff, cuts operational costs, and minimizes the risk of human error;
- supply chain optimization: AI can manage and optimize the supply chain in healthcare settings, ensuring that the right amount of medical supplies is available when needed, thereby reducing waste and saving costs;
- virtual assistants and chatbots: AI-driven chatbots can provide patients with 24/7 access to healthcare information, schedule appointments, and even offer preliminary medical advice. This enhances patient engagement and satisfaction by making healthcare more accessible;
- remote monitoring: Wearable devices and AI-driven health apps can monitor patients' health in real-time, providing feedback and recommendations directly to patients or healthcare providers. This continuous monitoring can improve chronic disease management and patient adherence to treatment plans;

- big data analytics: AI can analyse large datasets from various sources, including electronic health records (EHRs), clinical trials, and patient-generated data, to uncover trends and insights that can inform decision-making at both the individual patient and population health levels;
- evidence-based practices: by continuously learning from new data, AI can help healthcare providers adopt evidence-based practices, leading to more effective treatments and improved patient outcomes;
- automated compliance monitoring: AI systems can continuously monitor and analyse healthcare operations to ensure compliance with regulations and standards, reducing the risk of legal and financial penalties;
- clinical trials optimization: AI can improve the design and management of clinical trials by identifying suitable participants, predicting outcomes, and analysing results more efficiently;
- innovation in treatments: AI is driving the development of novel therapies, such as personalized medicine and gene editing techniques, by providing researchers with new tools to understand complex biological processes;
- scalable solutions: AI can help in scaling health solutions globally, particularly in resource-limited settings. For instance, AI-driven diagnostic tools can be deployed in areas with a shortage of healthcare professionals to provide essential diagnostic services;
- disease surveillance: AI can analyse global health data to predict and track the spread of infectious diseases, helping to manage and prevent outbreaks;
- data privacy: AI can help in implementing robust data privacy measures, ensuring that patient information is protected while still being used effectively to improve health outcomes;
- ethical AI use: Companies can leverage AI to ensure that their services are delivered fairly and ethically, such as by reducing biases in healthcare delivery and ensuring equitable access to care.

The integration of AI into a consumer-centric business seems to be not just a competitive advantage driver, but a necessity. AI offers transformative potential, from improving customer care and operational efficiency to driving innovation and ensuring compliance. Companies that embrace AI are likely to lead in delivering high-quality, cost-effective, and accessible healthcare equipment and care, ultimately contributing to better health outcomes on a global scale. All of the above seems to be a promising realm for the creation of new dynamic marketing capabilities for companies operating in the health and well-being market.

### **3. Using AI in the customer care of the company – a case study**

#### **3.1. AI forecasts for the health and well-being market**

To evaluate AI potential for Philips's business purposes, as well to diagnose the organization's capabilities and readiness company's managers have participated in profiled conferences, seminars and trainings. New knowledge collected, and gained skills and capabilities allowed them to respond to the AI business challenges and face in forecasts.

Collected predictions revealed that by 2027, AI will greatly influence organizations globally. Gartner predicts that 90% of analytics content consumers will become AI-enabled creators by 2025 (Beyond the Hype..., 2023). Over 70% of software vendors will integrate generative AI into their applications by 2026. Workforce roles will shift significantly, with many data analysts retraining as data scientists and moving into AI engineering. Additionally, AI's productivity impact will be recognized as a key economic indicator of national power.

In parallel the study from McKinsey & Company showed the projected impact of generative AI on productivity across various business functions for different industries. One of the industries with the highest AI potential is consumer goods, where companies like Philips, which provides products and services for end consumers, rely heavily on their marketing and sales functions. These functions serve crucial roles in the competitive landscape, both now and in the future, as they compete with other producers. The total potential productivity impact of generative AI on the Consumer Package Goods (CPG) industry, the health and well-being is a part of it, is estimated to be between \$160 billion to \$270 billion, representing 1.4% to 2.3% of the industry revenue. In CPG, generative AI is expected to have the most significant impact on Marketing and Sales, Customer Operations, and Product R&D. Other business functions such as Supply Chain and Operations, Strategy and Finance, Risk and Legal, Software Engineering, Corporate IT, and Talent and Organization are expected to see lower impacts from generative AI in the CPG market (Chui et al., 2023, p. 25).

#### **3.2. AI adaptation – proof of concept**

From the broader marketing and sales domain, the company has focused on AI adaptation into the consumer care process. At this stage, the purpose was to test elements of AI involvement, evaluate achieved outcomes, collect key learnings, and prepare for future steps – Support Chatbot business utilization.

A proof of concept for implementing a Support Chatbot has been tested if it can answer support-related questions specifically for Philips. To evaluate this proof of concept, the company used care agent staff. The primary goal was to initially develop a tool that would enhance the daily operations of care agents when interacting with consumers, while also evaluating whether the tool could eventually handle direct consumer interactions on its own

and under what conditions this would be feasible. The main objectives of the test were as follows:

- **Learning:** to determine if Philips could develop an application that leverages public data from multiple Philips sources using OpenAI, and to understand how this would work given that these large language models (LLMs) are pre-trained on vast amounts of data, but not specifically on the company's data or very recent data.
- **Performance (accuracy):** Once the company developed a functional application that allows users to query the Support Chatbot about public data, Philips wanted to assess the accuracy of its responses; and also considered potential strategies to further enhance the chatbot's accuracy and consistency.
- **Performance (speed):** the company wanted to evaluate whether the response times of queries to the LLM would be fast enough for use by Care Agents and potentially by consumers in the future. The goal was for responses to be delivered within seconds, although no specific time limit was set for this proof of concept. Additionally, a secondary proof point comes from testing the application with the country X care agents, which involves a language other than English. However, conducting a full-scale accuracy comparison between Country X and English is beyond the scope of this proof of concept.

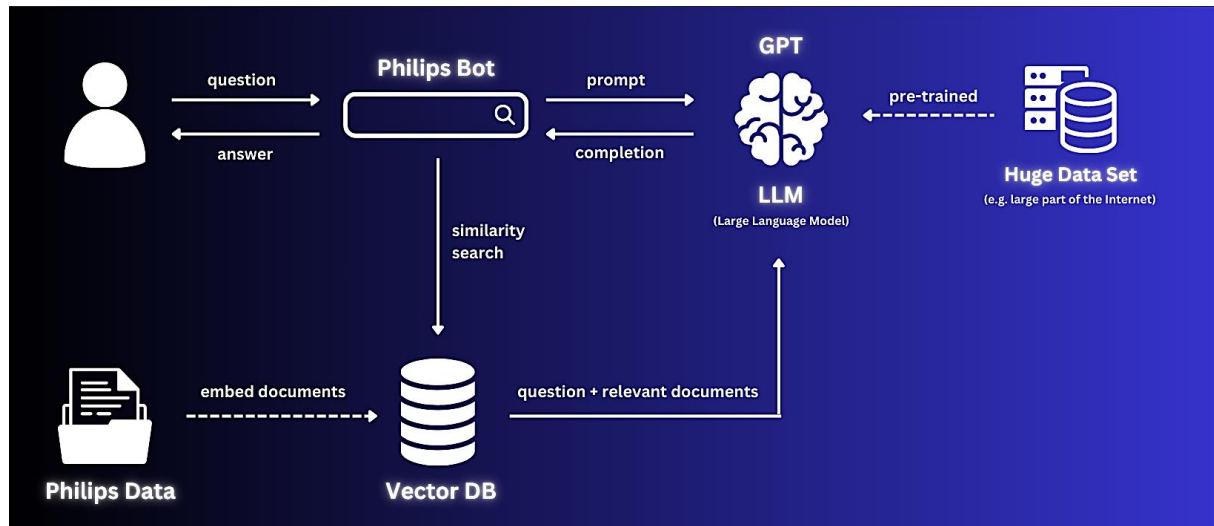
For this proof of concept, Philips wanted to ensure that no functionality or data would be exposed outside of Philips, so there were implemented the following precautions:

- the Philips Support Chatbot is only accessible through Philips and is not publicly available;
- the company exclusively use Azure OpenAI APIs provided under existing Microsoft contracts, which are protected by agreements with Microsoft;
- all data used to train the chatbot is publicly available information from Philips.com.

To assess the chatbot's performance, Country X was selected. Several support agents were asked to test the bot using around 100 of the most frequently asked questions they received to see how effectively it responds. The multiple versions of the chatbot were developed, with three currently available internally.

To test effectively LLMs with company-specific data, a method known as Retrieval Augmented Generation (RAG) was employed. The initial step involved developing a proprietary web application (the Philips Bot) that interacts with the LLM, in this case, GPT. RAG enables the integration of the company's data by adding context to the prompt sent to the LLM. For instance, if a user asks, "How can I best clean my shaver?", the query is enriched with relevant Philips documents where the answer is likely to be found. This enhanced prompt is then sent as a request to the LLM API, instructing it to generate a response based on the provided context.

The challenge lies in selecting the appropriate documents, as there is a limit to the size of the prompt that can be sent to the LLM. This is where vector databases come into play. Vector databases (see Figure 1) are specialized databases that store multi-dimensional vectors and can identify which vectors are closest to each other.



**Figure 1.** AI adaptation process in Philips.

Source: Philips' internal corporate documentation.

### 3.3. AI Implementation and Evolution

During the proof of concept, Philips developed a web application capable of hosting multiple versions of the chatbot side by side for ongoing evaluation and comparison. Although approximately 10 versions were technically created, only three were deployed, with the last two being made available internally for evaluation. The three deployed versions are detailed below.

#### Version 1 – Knowledge Articles

After conducting an initial evaluation of this version (without the involvement of Polish care agents), we observed the following. The model performs fairly well with very general questions, such as:

- "How can I best clean my shaver?"
- "How often do I need to clean my breast pump?"
- "Can I groom my dog with a hair clipper?"

However, the bot's knowledge of Philips-specific information could be improved, and it sometimes fabricates answers when it does not know the correct response, making these fabricated answers sound convincing. Additionally, the bot responds to all types of questions, both related and unrelated to Philips, including political questions and inquiries about other brands.



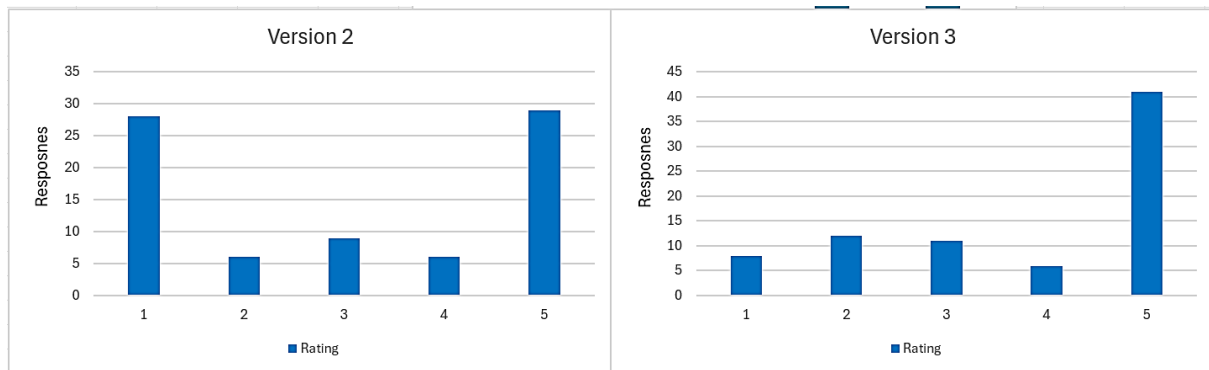
### **Version 2 – Blog Posts**

For the second version, Philips included an additional data source by incorporating blog posts that were typically written to provide support on frequently asked topics. These blog posts from the philips.com website were scraped, performed further preprocessing, and added to the same vector database as the knowledge articles. Additionally, the company experimented with prompt optimization to make the bot behave more like a Philips Support Agent, reduce answer fabrications, and limit its responses to the provided context in which it should operate. After evaluating this version (including feedback from Country X care agents), there were observed the following that the prompt optimization significantly improved the bot's ability to function as a Philips Support Bot and remain within the provided context boundaries. Incorporating rich blog articles, often written to address frequently asked questions, greatly enhanced the bot's ability to respond to inquiries commonly encountered by our Support Agents. Additionally, there was implemented logic for the bot to provide URLs to the documents it referenced for its answers. This feature helped identify and correct several inaccuracies in the online content.

During testing with support agents, this version of the bot was found to be already useful, with many of the answers being directly usable, resulting in substantial time savings. However, there was noticed that the bot struggled to correctly answer questions related to specific products and feature comparisons.

### **Version 3 – Product Library**

For the third version was utilized product content from the Philips Product Library (PPL), which is publicly available on philips.com. After preparing the data, it was loaded into the same vector store as the knowledge articles and blog posts. After evaluating this version it was observed that the addition of product content initially did not enhance the bot's performance because it appeared that the new documents were being ignored. However, introducing a second database and explicitly directing the bot to this database when exact products are requested resolved this issue. In Figure 2, it's visible how the questions from the list provided by the Support Agents were rated on a scale from 1 to 5 for each version. Answers rated 1 or 2 are considered relatively unhelpful, while those rated 4, and especially 5, are so effective that they could be directly copied and pasted as responses to consumers. This alone would be a significant time-saver for Support Agents, as it would eliminate the need to type out answers themselves, thereby reducing the time required to handle each query.



**Figure 2.** Result of utilization of product library into AI.

Source: Philips' internal corporate documentation.

### 3.4. AI Incorporation and Next Steps

After just a few weeks of this proof of concept, it can already draw some initial conclusions:

1. Generative AI and Large Language Models are very powerful and, even in their current form, can add significant value to internal processes.
2. Human supervision remains necessary at this stage because the models generate answers in real-time, which can sometimes be inconsistent or incorrect (a phenomenon known as "hallucination").
3. Hallucination happens because these models have primarily been trained to conduct human-like conversations and provide plausible answers. The focus now needs to shift toward producing factually accurate responses, a challenge that many companies are currently addressing through approaches such as:
  - RLHF (Reinforcement Learning with Human Feedback): in this method, large groups of people manually label answers as correct or incorrect to guide the next version of the model toward greater accuracy;
  - RLAI (Reinforcement Learning with AI Feedback): here, multiple models evaluate each other's answers to collaboratively determine the most accurate and consistent responses, creating labelled data that can be used to train future versions of the model.

The tool is currently undergoing testing in various countries. In the next phase, it will transition to the production stage with the following new features:

1. AI-powered automation of administrative tasks to enhance efficiency.
2. AI integration for directly handling customer inquiries in processes where agents have achieved high success rates.
3. AI support for generating pre-formulated responses that agents can review and send to customers.
4. Enhanced local language translation capabilities and extended support hours through AI, leading to reduced operational costs and improved Net Promoter Score (NPS).

5. Improved user interface design tailored for customer care agents.
6. Global process standardization to realize cost savings.

#### **4. Discussion and Conclusions**

The integration of Artificial Intelligence (AI) into marketing will significantly enhance an organization's dynamic marketing capabilities (DMC) potential. By leveraging AI, companies can develop new marketing routines and practices that are not only tailored to rapidly changing market conditions but also difficult for competitors to replicate. This ability to adapt and innovate marketing strategies through AI-driven insights and automation is a crucial factor in sustaining a competitive advantage, especially in consumer-centric industries like health and well-being.

The health and well-being market, characterized by its consumer-centric approach, seems to be beneficiary of AI's ability to optimize customer care and operational efficiency. AI applications such as personalized treatment plans, predictive analytics, and enhanced imaging analysis directly contribute to improved patient outcomes and consumer experiences. These innovations are critical for companies like Philips to maintain a competitive edge, as they enable more effective and efficient marketing and sales processes, ultimately leading to higher consumer satisfaction and brand loyalty.

The proof of concept for AI implementation in Philips' customer care demonstrates the potential of AI to significantly improve internal processes and consumer interactions. The development and testing of various versions of a support chatbot revealed that AI could effectively handle consumer queries, enhance the accuracy and speed of responses, and reduce the workload on support agents. These implementation process descriptions indicate that AI can serve as a valuable tool in optimizing customer care routines, which are essential for building dynamic marketing capabilities and strengthening competitive positioning in the market.

Despite the promising outcomes, the adaptation of AI in customer care also presents challenges, such as ensuring the accuracy of AI-generated responses and maintaining data privacy. The study highlights the importance of continuous refinement of AI models, including the integration of company-specific data and the implementation of robust privacy measures. These considerations are crucial for the successful deployment of AI in customer care and for realizing its full potential in enhancing marketing capabilities.

Discussing the paper's limitations and future research, this study focuses on the one large company which operates in health and well-being sector, future research could expand the analysis to other industries. Most of the current research focuses on large corporations with significant resources. Exploring how AI can be effectively implemented in small and medium

enterprises (SMEs), which may face resource constraints, could offer valuable insights into AI democratization in business. Investigating how AI affects dynamic marketing capabilities (DMC) in different consumer-centric or B2B industries could provide broader insights into AI's potential across various markets. The research relies on a single case study (Philips), which limits the generalizability of the findings. While the results are informative for companies in the health and well-being market, they may not apply universally to all industries or businesses. As companies like Philips operate globally, future research could examine how AI-driven marketing capabilities vary across different cultural and geographic contexts. This would provide insights into how businesses can tailor AI solutions to different markets and consumer preferences.

The study provides insights into the early and current stages of AI adoption, but it lacks an analysis of long-term AI adoption and the sustainability of its benefits over time. Since AI technologies continue to evolve, longitudinal studies examining the long-term impact of AI on dynamic marketing capabilities would be valuable. These studies could track how companies adapt their AI strategies over time and how AI integration influences business growth and competitiveness in the long run. Future research should delve deeper into the ethical challenges and privacy concerns associated with AI in marketing and customer care. As AI becomes more embedded in business processes, understanding how to navigate data privacy regulations and ethical AI use will become increasingly important.

The study primarily uses qualitative methods, which offer in-depth insights but lack measurable outcomes. The absence of quantitative data on metrics such as cost savings, revenue growth, or customer satisfaction post-AI implementation limits the ability to precisely quantify the benefits of AI. The study primarily employs qualitative methods. Future research could incorporate quantitative approaches, such as measuring the specific financial and operational outcomes resulting from AI implementation in customer care, marketing, and sales processes. Metrics like return on investment (ROI), customer satisfaction scores, and operational efficiency improvements could be studied.

The research focuses on specific AI applications in customer care (e.g., chatbots) but does not extensively explore the broader range of AI tools, such as machine learning models for predictive analytics or AI-driven content creation tools, which also have significant potential in marketing. The study points out challenges in ensuring AI accuracy and privacy but does not fully explore how these challenges can vary based on the complexity of AI models and the diversity of customer data. More research is needed to address how companies can overcome these obstacles across different AI applications.

These limitations provide avenues for future research, which could offer a more comprehensive understanding of AI's role in enhancing dynamic marketing capabilities across industries and over time.

The study suggests that the ongoing evolution of AI technologies will further amplify their impact on marketing and customer care processes. As AI becomes increasingly sophisticated, its role in shaping dynamic marketing capabilities will expand, offering companies new opportunities to innovate and adapt to market changes more rapidly. For Philips and similar organizations, investing in AI-driven solutions is not just a strategic advantage but a necessity for future-proofing their business in the competitive health and well-being market. These conclusions underscore the transformative potential of AI in developing dynamic marketing capabilities and enhancing customer care, positioning companies to better navigate the complexities of the modern market landscape.

## References

1. Abou-Foul, M., Ruiz-Alba, J., López-Tenorio, P. (2022). The impact of artificial intelligence capabilities on servitization: The moderating role of absorptive capacity- A dynamic capabilities perspective. *Journal of Business Research*, No. 157, <https://doi.org/10.1016/j.jbusres.2022.113609>
2. Al Mamun, K.A. *AI for Health: Revolutionizing Healthcare Through Innovation*. Retrieved from: <https://thecoronal.org/ai-for-health-revolutionizing-healthcare-through-innovation/>, 27.09.2024.
3. Alhashmi, S.F., Alshurideh, M., Al Kurdi, B., Salloum, S.A. (2020). *A systematic review of the factors affecting the artificial intelligence implementation in the health care sector*. Proceedings of the international conference on artificial intelligence and computer vision (AICV2020). Springer International Publishing, pp. 37-49, [https://doi.org/10.1007/978-3-030-44289-7\\_4](https://doi.org/10.1007/978-3-030-44289-7_4)
4. *Beyond the Hype: Scaling AI Strategic Support WS#1: general market trends and success criteria for AI adoption* (2023). Retrieved from: Gartner training for Philips.
5. Bruni, D.S., Verona, G. (2009). Dynamic Marketing Capabilities in Science-based Firms: An Exploratory Investigation of the Pharmaceutical Industry. *British Journal of Management*, Vol. 20, No. S1, p. 103, doi: 10.1111/j.1467-8551.2008.00615.x
6. Chui, M., Hazan, E., Roberts, R., Singla, A., Smaje, K., Sukharevsky, A., Yee, L., Zemme, R. (2023). *The economic potential of generative AI, The next productivity frontier*. McKinsey & Company. Retrieved from: [https://www.mckinsey.com/~/\\_/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20economic%20potential%20of%20generative%20ai%20the%20next%20productivity%20frontier/the-economic-potential-of-generative-ai-the-next-productivity-frontier.pdf](https://www.mckinsey.com/~/_/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/the%20economic%20potential%20of%20generative%20ai%20the%20next%20productivity%20frontier/the-economic-potential-of-generative-ai-the-next-productivity-frontier.pdf), 26.08.2024.

7. Dias, Á., Pereira, R. (2017). Dynamic Capabilities and Marketing Capabilities in Portugal. *Academia Revista Latinoamericana de Administración*, Vol. 30, Iss. 3, pp. 417-430, <https://doi.org/10.1108/ARLA-10-2016-0268>
8. Fidel, R. (1984). *The case study method: A case study*. University of Washington, pp. 273-288.
9. Jarek, K., Mazurek, G. (2019). Marketing and artificial intelligence. *Central European Business Review*, 8(2), pp. 45-55, doi: 10.18267/j.cebr.213
10. Kamboj, S., Rahman, Z. (2015). Marketing Capabilities and Firm Performance: Literature Review and Future Research Agenda. *International Journal of Productivity and Performance Management*, Vol. 64, No. 8, p. 1041, <https://doi.org/10.1108/IJPPM-08-2014-0117>
11. Kogut B., Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and the Replication of Technology. *Organization Science*, Vol. 3, No. 3, pp. 383-397, <https://doi.org/10.1287/orsc.3.3.383>
12. Konwar, Z., Papageorgiadis, N., Ahammad, M.F., Tian, Y., McDonald, F., Wang, Ch. (2017). Dynamic Marketing Capabilities, Foreign Ownership Modes, Sub-national Locations and the Performance of Foreign Affiliates in Developing Economies. *International Marketing Review*, Vol. 34, Iss. 5, p. 675, <https://doi.org/10.1108/IMR-01-2016-0004>
13. Kumar, A., Joshi, S. (2022). *Applications of AI in healthcare sector for enhancement of medical decision making and quality of service*. 2022 International Conference on Decision Aid Sciences and Applications (DASA), pp. 37-41, doi: 10.1109/DASA54658.2022.9765041
14. Kumar, V., Ashraf, A.R., Nadeem, W. (2024). AI-powered marketing: What, where, and how? *International Journal of Information Management*, No. 77, 102783, <https://doi.org/10.1016/j.ijinfomgt.2024.102783>
15. Manis, K.T., Madhavaram, S. (2023). AI-Enabled marketing capabilities and the hierarchy of capabilities: Conceptualization, proposition development, and research avenues. *Journal of Business Research*, Vol. 157, <https://doi.org/10.1016/j.jbusres.2022.113485>.
16. Mitreęa, M. (2016). Dynamiczne zdolności marketingowe jako obiekt badań w zarządzaniu. *Prace naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, no. 422, p. 316. doi: 10.15611/pn.2016.422.26
17. Mohamud, M., Sarpong, D. (2016). Dynamic Capabilities: Towards an Organizing Framework. *Journal of Strategy and Management*, Vol. 9, Iss. 4, pp. 511-526, <https://doi.org/10.1108/JSMA-11-2015-0088>
18. Ngo, L.V., O'Cass, A. (2012). In Search of Innovation and Customer-related Performance Superiority: The Role of Market Orientation, Marketing Capability, And Innovation Capability Interactions. *Journal of Product Innovation Management*, 29(5), p. 862, <https://doi.org/10.1111/j.1540-5885.2012.00939.x>

19. Peyravi, B., Nekrošienė, J., Lobanova, L. (2020). Revolutionised technologies for marketing: Theoretical review with focus on artificial intelligence. *Business: Theory and Practice*, 21(2), 827-834, <https://doi.org/10.3846/btp.2020.12313>
20. Pfajfar, G., Mitreġa, M., Shoham, A. (2024). International dynamic marketing capabilities: developments and a research agenda. *International Marketing Review*, No. 41(1), pp. 1-41. doi: 10.1108/IMR-10-2023-0283
21. Revell, G. (2024). Generative AI applications in the health and well-being domain: Virtual and robotic assistance and the need for niche language models (nlms). In: *Applications of Generative AI* (pp. 189-207). Cham: Springer International Publishing.
22. Thomas, G. (2011). A typology for the case study in social science following a review of definition, discourse, and structure. *Qualitative Inquiry*, No. 17(6), pp. 511-521, doi: 10.1177/1077800411409884
23. Wang, E.T., Hu, H.F., Hu, P.J.H., (2013). Examining the role of information technology in cultivating firms' dynamic marketing capabilities. *Information & Management*, No. 50(6), pp. 336-343, <https://doi.org/10.1016/j.im.2013.04.007>
24. Witczak, O. (2018). Zarządzanie marką w aspekcie rozwoju koncepcji dynamicznych zdolności marketingowych. *Studia Ekonomiczne Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, no. 362, p. 321.
25. Witczak, O., Narimanfar, S. (2022). Dynamic marketing capabilities in customer service on social networking sites (SNS). *Journal of Modern Science*, Vol. 2, Iss. 49, pp. 299-301, doi: <https://doi.org/10.13166/jms/156238>
26. Yin, R.K. (1984). *Case Study Research: Design and Methods*. Sage Publications, p. 243.





## SMART SOLUTIONS IN TRAFFIC MANAGEMENT – OPINIONS OF DRIVERS, CYCLISTS, AND PEDESTRIANS

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**Purpose:** The aim of the article is to present the results of a study on the perception and evaluation of intelligent communication and transportation systems, as well as their management, by residents of cities in the Silesian Voivodeship who travel by car, bicycle (scooter), or on foot, as factors contributing to safe and fast movement within the city.

**Design/methodology/approach:** The study was conducted using a proprietary survey based on the Consumer Satisfaction Index (CSI) methodology, and the analysis of the survey results was preceded by a brief literature review on the subject.

**Findings:** The study made it possible to determine how road users evaluate the functioning of the intelligent communication and transportation system in their cities, which factors are the most and least satisfactory for them, as well as the importance they assign to these solutions.

**Research limitations/implications:** The study had a limited scope as it was a one-time survey. It is advisable to continue and expand the sample size for future studies to allow for comparative analyses.

**Practical implications:** The article may provide managers of intelligent communication and transportation systems in cities with knowledge about the expected outcomes of their operation for road users.

**Social implications:** Utilizing the research results may enable better adaptation of ITS to the needs of road users and enhance road safety.

**Originality/value:** The study included drivers, cyclists (scooter riders), and pedestrians. In contrast, most similar studies are limited to verifying the opinions of drivers.

**Keywords:** smart city, smart mobility, management intelligent transports system, cyclists, drivers, pedestrians.

**Category of the paper:** research paper.

### 1. Introduction

Urban traffic and communication management are increasingly based on intelligent information systems. These systems enable traffic regulation by incorporating real-time data on traffic flow and potential disruptions. Such traffic management systems, known as Intelligent

Transportation Systems (ITS), encompass interconnected networks of public roads, traffic sensors, cameras, controllers, road information systems, and other information and communication tools typical of smart cities (Sami, Sara, 2023). The data collected and processed by artificial intelligence, using machine learning and advanced algorithms, allows for the implementation of smart solutions related to traffic light control, pedestrian crossings, and the activation or deactivation of additional traffic lanes. This, in turn, enables more efficient management of road infrastructure and the prediction of problems and risks associated with road traffic, which is a characteristic feature of smart roads (Lewicki, 2012; Garg, Kaur, 2023).

The tools used by cities in integrated, smart traffic management systems enable parking management, real-time generation of optimal routes for vehicles, development of eco-friendly forms of individual and public transport, promotion of alternative means of transportation (bikes, scooters, etc.), and the creation of interactive solutions for public transport users (Narayanaswami, 2022). The use of these solutions improves mobility comfort in the city, reduces environmental risks, increases the safety of public space users, and indirectly helps lower stress levels for urban traffic participants. It is also important to note that these systems are intended for all traffic participants, both motorized and non-motorized.

Many experts working on smart traffic management systems in cities focus on their design and functionality to ensure smooth vehicle traffic and eliminate bottlenecks through optimal use of intelligent transport (Sami, Sara, 2023), while paying considerably less attention to other road users. Increasingly, both international and domestic publications feature analyses on managing transportation systems as a key factor in smart city mobility. These systems provide a safe and friendly environment for residents, offering more convenient, safer, healthier, and longer lives, while also contributing to the creation of cities that are attractive to businesses and investors (Tomaszewska, 2022; Garg, Kaur, 2023). The importance and popularity of this topic among researchers are confirmed by the number of articles dedicated to it. In 2020, the Scopus database contained over 22,000 articles mentioning the term “intelligent transportation system” (Zulkarnain, Putri, 2021), and by the second half of 2024, that number had risen to over 22,700.

However, few studies focus on solutions and actions aimed at other urban traffic participants besides motor vehicle users: cyclists, pedestrians, scooter users, and others using personal mobility devices. This prompted the author to conduct a study to answer the question of how residents of cities in the Silesian Voivodeship, who travel by car, bike, scooter, or on foot, perceive the implemented and operational smart traffic management systems and their impact on the ability to move safely and quickly around the city. The study was conducted using a custom survey based on the CSI methodology. The results, preceded by a brief literature review, will be presented in the following sections of the article.

## 2. Literature Review

As mentioned in the introduction, the introduction of modern telematics solutions in urban traffic management contributes to the creation of a resident-, investor-, and business-friendly environment. It is also a factor in the harmonious and sustainable development of these cities, as well as the improvement of their functionality, which leads to a higher quality of life for residents (Wach-Kloskowska, Rześny-Cieplińska, 2018; Gusikhin, 2021). The use of telematics in transportation increases its efficiency, speed, and safety (Stankiewicz, Michalski, 2018; Kręt, 2020), and thus enhances the effectiveness of managing Intelligent Transportation Systems (ITS).

By implementing ITS, cities are realizing the concept of Smart City, in which smart mobility is used to increase traffic flow, thereby improving the comfort of movement within the city. This leads to reduced stress associated with city travel and the promotion of eco-friendly transport options, minimizing environmental degradation (Tomaszewska, 2015; Boichuk, 2021). According to Tomaszewska (2020), a Smart City cannot exist without Smart Mobility, where city managers take into account both technology and a consumer (resident)-oriented approach (Boichuk, 2021). This means that those managing intelligent traffic systems in cities must consider the needs of all traffic participants and implement solutions to minimize the negative impact of the transport system on the environment (Wróbel, 2023). Particularly important factors include reducing emissions, limiting noise, shortening travel times, improving safety, and minimizing road infrastructure degradation (Wach-Kloskowska, Rześny-Cieplińska, 2018; Kamiński, 2021; Zhao, Jia, 2021; and others).

City managers must also be aware that planning and building ITS is a complex and costly process, but it is significantly cheaper and easier than expanding and modernizing the existing road network and related infrastructure (Wąlek, 2016). Among the factors supporting the implementation of ITS in cities are legal regulations, including the Directive 2010/40/EU of the European Parliament and Council of 7 July 2010, concerning the deployment of Intelligent Transportation Systems in road transport and their interfaces with other transport modes, as well as the Polish Public Roads Act of 27 July 2012. According to the Directive, ITS should enable the integration of telecommunications, electronics, and information technology with transport engineering for the planning, design, operation, maintenance, and management of transportation systems. The quality of transport solutions must also meet the requirements of the ISO 37120 standard, which lists indicators that allow the assessment of a city's connectivity with different means of transport, transport accessibility, bicycle infrastructure, the use of private cars for commuting, public transport usage, and transport safety levels (Wróbel, 2023).

An analysis of the regulations in the cited documents suggests that they are primarily focused on participants in motorized transport. Cities' adherence to these guidelines ensures that motor vehicle users receive information about traffic jams and ways to avoid them,

the speed needed for smooth travel, roadworks, and even available parking spaces (Napora, Muzhevych, 2023).

Depending on traffic intensity, intelligent light control systems adjust signal cycle times to smooth traffic flow and prevent congestion. Induction loops embedded in the asphalt (coordination bundles) detect vehicle movement and send traffic data to control centers. In these centers, applications process the data and automatically adjust traffic light cycle times (Stankiewicz, Michalski, 2018), enabling the implementation of synchronized traffic lights, known as the "green wave" (Lewicki, 2012). The system is complemented by road cameras that record traffic and transmit real-time data to control and management units.

However, despite continuous progress and the introduction of newer, more convenient, and safer solutions, the potential effectiveness of various ITS applications has not been conclusively confirmed (Appaji, Raviraj, 2024). At the same time, studies indicate that the use of alternative means of transport is considered by system managers as a supplementary element, with less significance than motorized traffic. This situation limits the potential for the development of shared mobility, which reduces the use of combustion vehicles and promotes alternative transport modes and walking, thus reducing noise and air pollution, increasing safety, and encouraging pro-health behaviors among residents (Wróbel, 2021). At the same time, the guidelines for the development of smart mobility call on urban transportation system managers to create conditions for the broadest possible use of alternative transport modes and ensure their safe use. These actions include expanding roads and bike paths, creating intersections with traffic lights for cyclists, scooter users, and others.

It seems evident that ITS should also provide information to users of alternative transport devices in the same way it currently does for motor vehicle drivers (Dźwigoł, 2015). How residents perceive the adaptation of urban intelligent communication and transport systems management to the needs of those moving by car, bicycle (including scooters), and on foot in the cities of the Silesian Voivodeship will be presented in the following sections of the article.

### **3. Materials and methods**

Preparation for conducting the study to achieve the above goal required defining its subjects and object (Hall, 2013; Szarucki, 2018). The subjects were individuals living in large cities in the Silesian Voivodeship who travel primarily by car, bicycle, scooter, on foot, or by public transportation. The object of the study was their opinions regarding the evaluation of the solutions related to the management of intelligent transportation systems in their cities, aimed at improving the quality and safety of using public roads and communication routes in their cities.

In the next phase, hypotheses were formulated, which were verified during the analysis of the study results. It was assumed that:

1. Depending on the dominant mode of transportation, respondents would identify different elements of the intelligent transportation management system as the most satisfying for them.
2. Drivers would attach the greatest importance to the functioning of ITS, while cyclists/scooter users would attach the least.
3. For all groups of study participants, solutions that enhance the safety of road users would be of the greatest importance.

The study was conducted in October 2023 in large cities of the Silesian Voivodeship, using one of the survey techniques CSR (Sułkowski, Lenart-Gansiniec, 2012; Strużyna, 2013; Huang, 2020). This index is based on the principle of weighted assessment, and its result consists of the evaluation of individual elements and their assigned weights (Yussoff, Nayan, 2020; Woźniak, Zimon, 2016). The CSI was calculated using a weighted average –  $\bar{x}_w$ , and the CSI index was computed based on formulas (Woźniak, Zimon, 2016; Sobczyk, 2020):

$$CSI = \sum_{i=1}^n w_i o_i \quad (1)$$

where:

$i$ , 1, ...  $n$  - elements of respondent's satisfaction,

$w_i$  - the weight of the respondent's satisfaction element,

$o_i$  - assessment of the respondent's satisfaction element.

$$CSI_{max} = \sum_{i=1}^n w_i o_{i_{max}} \quad (2)$$

$$CSI\% = \frac{CSI}{CSI_{max}} \times 100\% \quad (3)$$

According to Woźniak and Zimon's (2016) recommendations, the results were expressed as percentages to facilitate the analysis:

- 0-40% – very bad, respondent completely dissatisfied,
- 41-60% – bad, respondent dissatisfied,
- 61-75% – average, there are problems with the level of respondent's satisfaction,
- 76-90% – good, no problems were found with the respondent's satisfaction level,
- 91-100% – very good, highly satisfied respondent.

The research process included the following stages (Mróz, 2017): defining the research objective and hypotheses, preparing the survey questionnaire, conducting the survey, analyzing the obtained data, calculating CSI indicators and comparing them and developing a quality map.

The questionnaire consisted of a demographic section and a substantive section. The first section provided independent variables to describe respondents in terms of: gender, age, education level, and dominant mode of transportation in the city. The dependent variables were used to investigate respondents' opinions on their level of satisfaction with selected

ITS solutions and the significance of these solutions, as well as the relationships between them (Minta, Cempiel, 2017).

The first question was not related to the main study but served as a screening question; respondents were asked if they knew what an intelligent transportation system is and if it operates in their city. Respondents who answered affirmatively to both questions proceeded to the next part of the survey. Fifteen factors were identified to assess satisfaction with nine popular ITS solutions and six of their effects, as well as their significance. The selection of respondents was random, and the sample size was relatively small, which does not allow for the conclusion that the study was representative. Respondents rated individual issues using a five-point Likert scale (Sobczyk, 2020). For satisfaction, the scale ranged from 1 – very dissatisfied, through 2 – somewhat dissatisfied, 3 – neutral, 4 – somewhat satisfied, to 5 – very satisfied. The significance (importance) of individual elements was rated as follows: 1 – insignificant, 2 – somewhat insignificant, 3 – neutral, 4 – significant, 5 – very significant. Based on these scales, statistical analysis was conducted following the CSI procedure (Mróz, 2017), which determined the level of satisfaction and the importance of individual factors for the respondents. After performing statistical and descriptive analysis of the survey results, a quality map was developed, as illustrated in Figure 1.

|                     |      |   |   |
|---------------------|------|---|---|
| <b>satisfaction</b> | high | quarter 1<br><i>Field of excessive care</i><br><br>not very important,<br>but giving great satisfaction | quarter 3<br><i>Field of sustaining engagement</i><br><br>very important<br>and giving great satisfaction |
|                     | low  | quarter 2<br><i>Field of trivialities</i><br><br>not very important<br>and giving little satisfaction   | quarter 4<br><i>Field of concentration</i><br><br>very important<br>but giving little satisfaction        |
|                     |      | low   | high  |
|                     |      | <b>importance</b>   |   |

**Figure 1.** Evaluation areas considering discrepancies between importance and engagement.

Source: compiled by the author based on: Woźniak, Zimon, 2016, p. 144.

The subsequent part of the article will discuss the study results and summarize the findings along with the verification of the hypotheses.

## 4. Results

The analysis of the survey began with the verification of the questionnaires and the elimination of incomplete or incorrectly filled ones. Subsequently, the data from the qualified questionnaires were entered into an MS Excel spreadsheet, which facilitated calculations and the preparation of the research report. The preparation and discussion of the study results are preceded by a description of the respondents (Table 1).

A total of 811 respondents participated in the study: 168 cyclists, 372 drivers, and 271 pedestrians. Among cyclists and pedestrians, women predominated – 122 female cyclists (76.2%) and 192 female pedestrians (70.9%), while men constituted 46 (27.4%) and 79 (29.1%) respectively. Among drivers, the trend was reversed, with more men – 197 (53%) and 175 women (47%).

Age varied significantly among respondents. There were no cyclists over the age of 65, while the largest age group among pedestrians was those over 65 – 108 (39.8%). In contrast, this was the smallest group among drivers – 18 respondents. Among drivers, 19 indicated that they were under 25 years old, while among pedestrians, 52 were in this age group, with the fewest cyclists in this age group – only 4. Most cyclists reported that their age was between 36 and 45 years – 73 people, while among drivers, those aged 46-55 were the majority – 146 participants. Among pedestrians, in addition to those over 65 and under 25, there were 23 respondents aged 26-35, 16 aged 36-45, 43 aged 46-55, and 29 who were 56-65 years old.

For the last demographic characteristic – education – most cyclists and drivers indicated that they had higher education, while among pedestrians, 63 respondents had this level of education, totaling 54.2% of all respondents – 440 individuals. Among pedestrians, those with secondary education predominated – 187 people (69%), with some still studying at the time of the survey.

In the further analysis of the study results, the importance of ITS solutions functioning in their cities and the level of satisfaction with telematics solutions aimed at improving people's mobility and enhancing the quality of communication and transportation processes were assessed (Tables 2 and 3). First, the level of satisfaction with the studied solutions was evaluated. The data for calculating the satisfaction levels of individual respondent groups with the assessed solutions and effects of managing the intelligent communication and transportation system are presented in Table 2.

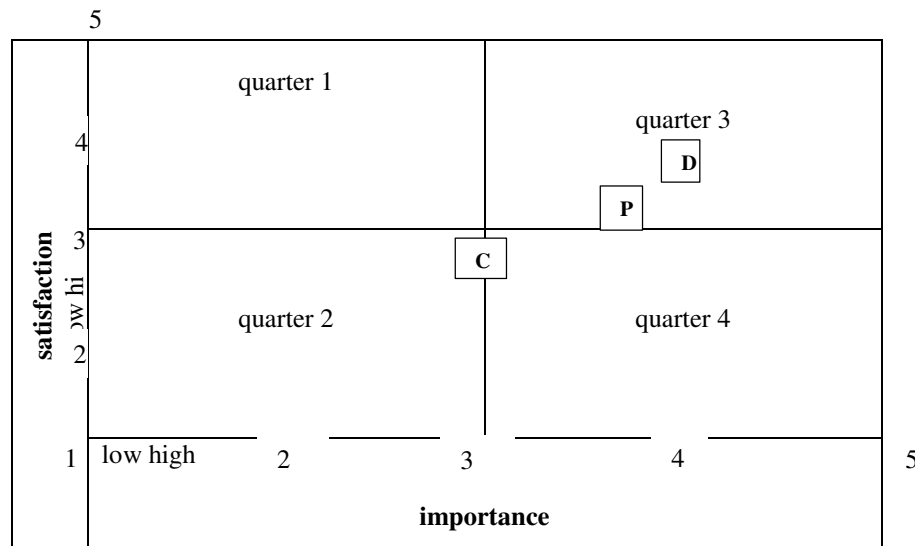
Drivers considered the reduction in the number of accidents ( $\bar{x}_w = 3.86$ ) as the most satisfying outcome of the intelligent communication and transportation system management, while the least satisfying element for them was intelligent traffic lights ( $\bar{x}_w = 1.92$ ). Cyclists/scooter users surprisingly rated the interactive parking system ( $\bar{x}_w = 4.4$ ) as the most satisfying, and the green wave for drivers ( $\bar{x}_w = 2.6$ ) as the least satisfying. Pedestrians, on the other hand, rated the road event monitoring system ( $\bar{x}_w = 4$ ) as the most satisfying solution, and the reduction of traffic congestion in the city streets ( $\bar{x}_w = 2.88$ ) as the least satisfying.

After verifying the information regarding the ranking of individual factors surveyed in the questionnaire, it was found that for drivers, the most significant factor was the "green wave" ( $\bar{x}_w = 4.33$ ), while the least significant was road event monitoring ( $\bar{x}_w = 3.13$ ). Cyclists considered the reduction in the number of accidents ( $\bar{x}_w = 3.98$ ) as the most important, whereas weather information availability was the least significant to them ( $\bar{x}_w = 2.4$ ). For pedestrians, as with cyclists, the reduction in the number of accidents ( $\bar{x}_w = 4.27$ ) was of key importance, which certainly enhances their sense of safety. The "green wave" ( $\bar{x}_w = 3.04$ ) was the least significant factor for them, which seems logical since this solution primarily benefits drivers.

Comparing the values reflecting the evaluation of individual issues shown in the tables may help explain the low satisfaction rating from drivers regarding the "green wave" solution. The high ranking of this solution, combined with a relatively low satisfaction rating, indicates that it is desirable but likely does not meet drivers' expectations. The low ratings from cyclists and pedestrians for this solution also seem quite understandable. It should also be emphasized that both cyclists and pedestrians place great importance on increasing road safety and reducing the number of dangerous traffic incidents. Their concern for improving safety is fully justified, as their health and lives are particularly at risk.

The next step in the research procedure is to calculate the CSI and its percentage value (Table 4). The overall CSI value for drivers was 3.19 (63.8%), for cyclists it was 3.115 (62.3%), and for pedestrians, it was 3.657 (73.14%). Comparing these values with the data presented in Table 1, it was found that the overall level of satisfaction with the functioning of the intelligent transportation system in the studied cities falls within the average range for all three respondent groups. The final step in the CSI procedure was to plot the average satisfaction ratings resulting from the use of ITS and the importance of selected functional solutions and their effects on the quality map (Fig. 2).





Legend:

c – cyclists (2,89; 3,09),

d – drivers (3,95; 4,13),

p – pedestrians (3,37; 3,63),

**Figure 2.** The ITS quality map was created based on the opinions of cyclists and drivers.

Source: Own study based on the survey.

Placing the average satisfaction values of the assessed solutions and their importance for respondents on the quality map grid illustrates the differences in perspectives among the studied groups of ITS users. It can also serve as a starting point for discussions about future directions for the development of this system and its individual solutions, aiming to better meet the needs of residents and contribute to creating a system that ensures even greater efficiency, safety, and quality of life for city inhabitants.

In concluding the analysis, it should be noted that it only addressed a fragment of the reality of managing intelligent transportation systems in Polish cities. Therefore, further research on the issues discussed in the article appears to be warranted.

## 5. Summary

Rapidly developing cities and the increasing intensity and density of road traffic associated with their growth demand modern solutions that enable residents to enjoy a high quality of life. The concept of a smart city, which includes Smart Mobility as one of its components, addresses these expectations by focusing on the users of the city's transportation system. Its goal is to provide urban residents with the best conditions for traveling by various means of transport and to improve the efficiency and quality of urban transportation system management. This can be achieved through the implementation of intelligent solutions. For these solutions to fulfill their

role and serve city residents and all public road users, they must meet the usability standards expected by public transportation users in cities. Systematic verification of their effectiveness and functionality is essential, as attempted in the above article.

Due to the multifaceted nature of the issue, not all related aspects were examined. The focus was on the most commonly used solutions in cities and their basic effects.

The analysis of the survey results presented in the article allowed for the verification of the hypotheses formulated for the study. The first hypothesis assumed that the predominant mode of transportation of respondents determines which elements of the intelligent transportation management system they perceive as most satisfying. Based on the indications shown in Table 2, this hypothesis was confirmed. For drivers, the most satisfying aspect was the reduction in collisions and accidents; for cyclists (rather surprisingly), it was the existence of an interactive parking system; and for pedestrians, it was the road event monitoring system. The least satisfying elements were: for drivers, intelligent traffic lights; for cyclists, the green wave; and for pedestrians, the reduction of traffic congestion on streets.

The second hypothesis proposed that drivers would attach the greatest importance to the functioning of ITS, while cyclists/scooter users would attach the least. The study revealed that the differences in evaluation among the participant groups were minor, thus this hypothesis was inconclusive. However, the third hypothesis was confirmed: all groups of study participants placed great importance on solutions that enhance their safety as road users. For drivers, the green wave was a more significant solution, but it should be noted that this solution contributes to increased road safety.

Thus, it can also be concluded that the study's objective was achieved. The analysis of the study results provided an answer to the question of how residents of the Silesian Voivodeship, traveling by car, bicycle (or scooter), and on foot, perceive the implemented and functioning intelligent traffic management systems and their impact on the ability to travel safely and quickly around the city. At the same time, there is a clear need to continue this type of research and expand its scope to address additional issues related to this topic.

## References

1. Appaji, A., Raviraj, P. (2024). Effectiveness of Recent Methodologies of Intelligent Transportation System. *International Journal of Intelligent Transportation Systems Research*, Vol. 22, pp. 34-43. DOI: 10.1007/s13177-023-00376-y
2. Boichuk, N. (2021). Smart mobility jako podstawowy element koncepcji inteligentnego miasta – studium przypadku wybranych polskich miast. *Rozprawy i Studia – Uniwersytet Szczeciński*, Vol. 1153, pp. 59-72.

3. Directive 2010/40/EU of the European Parliament and of the Council on the framework for the development of Intelligent Transport Systems in the Field of road transport and for interfaces with other modes of transport (EU).
4. Dźwigoł, H. (2015). Warsztat badawczy w naukach o zarządzaniu. *Zeszyty Naukowe Politechniki Śląskiej. Organizacja i Zarządzanie*, Vol. 83, p. 140.
5. Garg, T., Kaur, G. (2023). A Systematic Review on Intelligent Transport Systems. *Journal of Computational and Cognitive Engineering*, Vol. 2(3), pp. 175-188. DOI: 10.47852/bonviewJCCE2202245
6. Gusikhin, O. (2021). The Impact of COVID-19 Experience on Smart City and Future Mobility. In: M. Helfert, C. Clain, B. Donnelland, K. Berns, O. Gusikhin (eds.), *Smart Cities, Green Technologies, and Intelligent Transport Systems*. 9th International Conference, SMARTGREENS 2020, and 6th International Conference, VEHITS 2020. Prague: Springer Nature, pp. 308-321.
7. Hall, H. (2013). Zastosowanie metod NPS i CSI w badaniach poziomu satysfakcji i lojalności studentów. *Modern Management Review*, Vol. XVIII, No. 20, pp. 51-61.
8. Huang, Y.-T. (2020). Internal Marketing and Internal Customer: A Review, Reconceptualization, and Extension. *Journal of Relationship Marketing*, Vol. 19, Iss. 3, pp. 1-17. DOI: 10.1080/15332667.2019.1664873
9. ISO 37120: Sustainable development of communities. First edition 2014-05-15 Indicators for city services and quality of live.
10. Kamiński, T. (2021). *Zrównoważona mobilność w aspekcie inteligentnych rozwiązań w transporcie*. Warszawa: Instytut Transportu Samochodowego.
11. Kręt, P. (2020). Inteligentne systemy transportowe w smart city. *Management and Quality*, Vol. 2, No. 2, pp. 42-54.
12. Lewicki, W. (2012). Inteligentne systemy transportowe jako narzędzie inżynierii ruchu drogowego. *Autobusy*, No. 7-8, pp. 106-111.
13. Minta, S., Cempiel, M. (2017). Badanie satysfakcji konsumentów produktu tradycyjnego na przykładzie oscypka. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, Vol. 6, pp. 176-181. DOI: 10.5604/01.3001.0010.7925
14. Mróz, M. (2017). Dobór zmiennych niezależnych w modelowaniu procesów logistycznych metodą analizy grafów. *Zeszyty Naukowe Akademii Sztuki Wojennej*. No. 3(108), pp. 129-155. DOI: 10.5604/01.3001.0010.8420
15. Napora, W., Muzhevych, T. (2023). Inteligentne systemy transportowe oraz przykład autonomicznego środka transportu miejskiego. *Zeszyty Studenckie „Nasze Studia”*, No. 13, pp. 89-97.
16. Narayanaswami, S. (2022). *Intelligent Transportation Systems: Concepts and Cases*. Cambridge: Cambridge Scholars Publishing.

17. Sami, M., Sara, K. (2023). Intelligent Transportation Systems for Sustainable Urban Environments. *International Journal of Advanced Natural Sciences and Engineering Researches*, Vol. 7, pp. 166-177. DOI: 10.13140/RG.2.2.18697.83040
18. Sobczyk, M. (2022). Zastosowanie metody CSI w ocenie jakości usług komunikacji miejskiej w Sieradzu. In: J. Brach, I. Dziaduch (eds.), *Logistyka i transport – debiuty studenckie*. Wrocław: Uniwersytet Ekonomiczny we Wrocławiu.
19. Stankiewicz, J., Michalski, K. (2018). Rozwiązania z zakresu inteligentnych systemów transportowych w wybranych miastach w Polsce. *Ekonomika i Organizacja Logistyki*, No. 3(3), pp. 79-91. DOI: 10.22630/EIOL.2018.3.3.24
20. Strużyna, J. (2013). Oryginalność w badaniach w nauce zarządzania. In: W. Czakon (ed.), *Podstawy metodologii badań w naukach o zarządzaniu*. Warszawa: Wolters Kluwer Polska.
21. Sułkowski, Ł., Lenart-Gansiniec, R. (2012). *Epistemologia, metodologia i metody badań w naukach o zarządzaniu i jakości*. Łódź: Społeczna Akademia Nauk.
22. Szarucki, M. (2018). Analiza zakresów tematycznych teoretycznych rozważań w subdyscyplinie metodologia nauk o zarządzaniu. *Organizacja i Kierowanie*, No. 2, pp. 27-40.
23. Tomaszewska, E.J. (2015). Inteligentny system transportowy w mieście na przykładzie Białegostoku. *Problemy Zarządzania, Finansów i Marketingu*, No 41/2, pp. 317-329. DOI: 10.18276/pzfm.2015.41/2-26
24. Tomaszewska, E.J. (2022). Korzyści wdrożenia inteligentnego systemu transportowego w mieście. *Akademia Zarządzania*, No. 6(3), pp. 333-362.
25. Ustawa z dnia 27 lipca 2012 roku o drogach publicznych of 27.07.2012, Dz.U. 2012, poz. 965.
26. Wach-Kloskowska, M., Rześny-Cieplińska, J. (2018). Inteligentny i zrównoważony rozwój transportu jako element realizacji koncepcji smart city – przykłady polskie i europejskie. *Studia Miejskie*, Vol. 30, pp. 99-108. DOI: 10.25167/sm2018.030.07
27. Wałek, T. (2016). Inteligentne systemy transportowe jako instrument poprawy bezpieczeństwa. *Security, Economy & Law*, No. 2, pp. 67-73.
28. Woźniak, J., Zimon, D. (2016). Zastosowanie metody CSI do badania satysfakcji konsumentów na przykładzie wybranej sieci handlowej. *Modern Management Review*, Vol. XXI, No. 23, pp. 219-228. DOI: 10.7862/rz.2016.mmr.37
29. Wróbel, I. (2023). Rozwiązania i wskaźniki transportowe w inteligentnych miastach. Część 2. *Problemy Kolejnictwa*, Vol. 199, pp. 37-46. DOI: 10.36137/1994P
30. Yussoff, N.M., Nayan, S.M. (2020). Review on customer satisfaction. *Journal of Undergraduate*, Vol. 2, No. 2, pp. 1-9.

31. Zhao, L., Jia, Y. (2021). Intelligent transportation system for sustainable environment in smart cities. *The International Journal of Electrical Engineering Education*, Vol. 60, pp. 40-48. DOI: 10.1177/0020720920983503
32. Zulkarnain, Putri, T.D. (2021). Intelligent transportation systems (ITS): A systematic review using a Natural Language Processing (NLP) approach. *Heliyon*, No. 7, e08615. DOI: 10.1016/j.heliyon.2021.e08615

## Appendix

**Table 1.**  
*Demographic characteristics of the respondents*

| Characteristic |                    | The number of respondents (%) |                  |                  | Total            |
|----------------|--------------------|-------------------------------|------------------|------------------|------------------|
|                |                    | c                             | d                | p                |                  |
| sex            | women              | 122 (72,6)                    | 175 (47)         | 192 (70,8)       | 489 (60,3)       |
|                | men                | 46 (27,4)                     | 197 (53)         | 79 (29,2)        | 322 (39,7)       |
| <b>Σ</b>       |                    | <b>168 (100)</b>              | <b>372 (100)</b> | <b>271 (100)</b> | <b>811 (100)</b> |
| age            | ≤25 year           | 4 (2,4)                       | 19 (5,2)         | 52 (19,2)        | 75 (9,2)         |
|                | 26-35 year         | 66 (39,3)                     | 43 (11,6)        | 23 (8,5)         | 132 (16,3)       |
|                | 36-45 year         | 73 (43,4)                     | 85 (22,8)        | 16 (5,9)         | 174 (21,5)       |
|                | 46-55 year         | 22 (13,1)                     | 146 (39,2)       | 43 (15,9)        | 211 (26)         |
|                | 56-65 year         | 3 (1,8)                       | 61 (16,4)        | 29 (10,7)        | 93 (11,5)        |
|                | >65 year           | -                             | 18 (4,8)         | 108 (39,8)       | 126 (15,5)       |
| <b>Σ</b>       |                    | <b>168 (100)</b>              | <b>372 (100)</b> | <b>271 (100)</b> | <b>811 (100)</b> |
| education      | vocational         | 17 (10,1)                     | 20 (5,4)         | 21 (7,7)         | 58 (7,7)         |
|                | l. o.              | 5 (3)                         | 31 (8,3)         | 106 (39,1)       | 142 (17,5)       |
|                | techn. sec. school | 29 (17,3)                     | 61 (16,4)        | 81 (29,9)        | 171 (21,1)       |
|                | I° studies         | 53 (31,5)                     | 123 (33,1)       | 36 (13,3)        | 212 (26,1)       |
|                | II° studies        | 64 (38,1)                     | 137 (36,8)       | 27 (10)          | 228 (28,1)       |
| <b>Σ</b>       |                    | <b>168 (100)</b>              | <b>372 (100)</b> | <b>271 (100)</b> | <b>811 (100)</b> |

Legend:

c – cyclists,  
d – drivers,  
p – pedestrians.

Source: Own study based on the survey.

**Table 2.**  
*The level of satisfaction of respondents with ITS elements and their effects in the city*

| No | Factor                           | Satisfaction level (W <sub>i</sub> ) |    |    |    |    |    |     |     |     |    |     |     |    |    |     |             |            |          |
|----|----------------------------------|--------------------------------------|----|----|----|----|----|-----|-----|-----|----|-----|-----|----|----|-----|-------------|------------|----------|
|    |                                  | 1                                    |    |    | 2  |    |    | 3   |     |     | 4  |     |     | 5  |    |     | $\bar{x}_w$ |            |          |
|    |                                  | c                                    | d  | p  | c  | d  | p  | c   | d   | p   | c  | d   | p   | c  | d  | p   | c           | d          | p        |
| 1. | intelligent traffic signals      | 58                                   | 2  | 26 | 73 | 7  | 64 | 31  | 198 | 47  | 4  | 101 | 97  | 2  | 64 | 37  | <b>1,92</b> | 3,92       | 3,2      |
| 2. | dedicated bike lanes and paths   | 4                                    | 6  | 9  | 16 | 13 | 17 | 120 | 206 | 108 | 22 | 98  | 83  | 3  | 49 | 54  | 2,91        | 3,85       | 3,58     |
| 3. | "green wave" for cars            | 12                                   | 11 | 9  | 38 | 93 | 31 | 97  | 194 | 208 | 16 | 41  | 17  | 5  | 33 | 6   | 2,78        | <b>2,6</b> | 2,93     |
| 4. | road and intersection monitoring | 11                                   | 5  | 5  | 17 | 17 | 21 | 107 | 211 | 49  | 20 | 92  | 116 | 13 | 47 | 33  | 3,04        | 3,6        | 3,04     |
| 5. | road incident monitoring         | 39                                   | 2  | 7  | 51 | 12 | 19 | 52  | 146 | 41  | 18 | 117 | 103 | 8  | 95 | 101 | 2,5         | 4          | <b>4</b> |
| 6. | interactive road signs           | 18                                   | 1  | 18 | 32 | 9  | 27 | 95  | 149 | 96  | 19 | 106 | 88  | 4  | 12 | 42  | 2,75        | 4,08       | 3,39     |
| 7. | weather information              | 5                                    | 0  | 8  | 24 | 6  | 29 | 58  | 139 | 62  | 62 | 141 | 93  | 19 | 86 | 79  | 3,39        | 4,25       | 3,76     |
| 8. | interactive parking system       | 12                                   | 2  | 8  | 19 | 14 | 15 | 78  | 122 | 157 | 48 | 152 | 47  | 11 | 82 | 44  | 3,16        | <b>4,4</b> | 3,38     |
| 9. | city bike system                 | 19                                   | 15 | 11 | 28 | 31 | 26 | 89  | 243 | 158 | 23 | 71  | 49  | 9  | 12 | 27  | 2,86        | 2,65       | 3,2      |

Cont. table 2.

|     |                                       |    |   |    |    |    |    |    |     |     |    |     |     |    |    |    |             |      |             |
|-----|---------------------------------------|----|---|----|----|----|----|----|-----|-----|----|-----|-----|----|----|----|-------------|------|-------------|
| 10. | traffic flow optimization in the city | 7  | 3 | 6  | 73 | 11 | 37 | 53 | 184 | 149 | 28 | 103 | 51  | 7  | 71 | 28 | 2,74        | 3,98 | 3,21        |
| 11. | fewer cars in the city center         | 28 | 5 | 34 | 53 | 9  | 41 | 64 | 192 | 87  | 19 | 98  | 62  | 4  | 68 | 47 | 2,51        | 3,93 | 3,17        |
| 12. | reduced traffic congestion            | 35 | 5 | 26 | 82 | 26 | 79 | 28 | 207 | 91  | 17 | 81  | 53  | 6  | 53 | 22 | 2,27        | 3,5  | <b>2,88</b> |
| 13. | reduced emissions and CO <sub>2</sub> | 22 | 2 | 18 | 28 | 21 | 37 | 47 | 194 | 118 | 54 | 96  | 69  | 17 | 59 | 29 | 3,09        | 3,8  | 3,2         |
| 14. | fewer accidents                       | 7  | 5 | 9  | 12 | 19 | 31 | 16 | 219 | 24  | 96 | 82  | 117 | 37 | 47 | 90 | <b>3,86</b> | 3,7  | 3,92        |
| 15. | increased road safety                 | 11 | 9 | 13 | 19 | 15 | 23 | 20 | 234 | 61  | 87 | 73  | 112 | 31 | 41 | 62 | 3,61        | 3,43 | 3,69        |

Legend:

c – cyclists,

d – drivers,

p – pedestrians.

Source: Own study based on the survey.

**Table 3.***The importance of individual ITS elements and the effects of their operation*

| No  | Factor                                | Rang (C <sub>i</sub> ) |    |    |    |    |    |     |     |     |    |     |     |    |    |     |             |             |             |
|-----|---------------------------------------|------------------------|----|----|----|----|----|-----|-----|-----|----|-----|-----|----|----|-----|-------------|-------------|-------------|
|     |                                       | 1                      |    |    | 2  |    |    | 3   |     |     | 4  |     |     | 5  |    |     | $\bar{x}_w$ |             |             |
|     |                                       | c                      | d  | p  | c  | d  | p  | c   | d   | p   | c  | d   | p   | c  | d  | p   | c           | d           | p           |
| 1.  | intelligent traffic signals           | 0                      | 0  | 2  | 7  | 9  | 8  | 151 | 143 | 143 | 6  | 196 | 84  | 1  | 24 | 34  | 3           | 4,05        | 3,52        |
| 2.  | dedicated bike lanes and paths        | 1                      | 3  | 3  | 32 | 12 | 29 | 123 | 206 | 92  | 9  | 107 | 68  | 3  | 44 | 79  | 2,89        | 3,68        | 3,7         |
| 3.  | "green wave" for cars                 | 5                      | 2  | 2  | 21 | 7  | 63 | 91  | 173 | 142 | 44 | 103 | 51  | 7  | 87 | 13  | 3,16        | <b>4,33</b> | <b>3,04</b> |
| 4.  | road and intersection monitoring      | 3                      | 2  | 2  | 15 | 15 | 11 | 93  | 148 | 67  | 48 | 184 | 108 | 9  | 23 | 83  | 2,72        | 3,95        | 3,96        |
| 5.  | road incident monitoring              | 13                     | 61 | 7  | 27 | 92 | 68 | 120 | 143 | 98  | 6  | 47  | 54  | 2  | 29 | 44  | 2,74        | <b>3,13</b> | 3,22        |
| 6.  | interactive road signs                | 5                      | 2  | 12 | 17 | 9  | 19 | 109 | 195 | 103 | 35 | 112 | 76  | 2  | 54 | 61  | 3,07        | 4,15        | 3,57        |
| 7.  | weather information                   | 19                     | 5  | 2  | 79 | 11 | 28 | 57  | 169 | 53  | 11 | 122 | 97  | 2  | 65 | 91  | <b>2,4</b>  | 4,25        | 3,92        |
| 8.  | interactive parking system            | 17                     | 3  | 21 | 71 | 15 | 59 | 64  | 181 | 104 | 13 | 111 | 53  | 3  | 62 | 34  | 2,49        | 4,1         | 3,07        |
| 9.  | city bike system                      | 10                     | 9  | 3  | 18 | 17 | 11 | 86  | 269 | 209 | 39 | 31  | 39  | 15 | 46 | 9   | 3,19        | 3,4         | 3,15        |
| 10. | traffic flow optimization in the city | 5                      | 8  | 6  | 17 | 14 | 12 | 121 | 217 | 194 | 22 | 76  | 42  | 3  | 57 | 17  | 3           | 3,63        | 3,19        |
| 11. | fewer cars in the city center         | 16                     | 6  | 6  | 24 | 19 | 18 | 105 | 202 | 83  | 14 | 84  | 91  | 9  | 61 | 73  | 2,86        | 3,88        | 3,76        |
| 12. | reduced traffic congestion            | 7                      | 3  | 2  | 42 | 9  | 31 | 67  | 179 | 46  | 38 | 102 | 114 | 14 | 79 | 78  | 3,06        | 4,23        | 3,87        |
| 13. | reduced emissions and CO <sub>2</sub> | 3                      | 5  | 2  | 9  | 11 | 15 | 32  | 131 | 47  | 95 | 152 | 108 | 29 | 73 | 99  | 3,82        | 4,13        | 4,06        |
| 14. | fewer accidents                       | 3                      | 11 | 1  | 9  | 24 | 6  | 17  | 243 | 34  | 98 | 83  | 107 | 41 | 11 | 123 | <b>3,98</b> | 3,58        | <b>4,27</b> |
| 15. | increased road safety                 | 5                      | 9  | 2  | 11 | 29 | 6  | 16  | 253 | 22  | 97 | 74  | 143 | 39 | 7  | 98  | 3,92        | 3,55        | 4,21        |

Legend:

c – cyclists,

d – drivers,

p – pedestrians.

Source: Own study based on the survey.

**Table 4.**  
*Calculation of the CSI Index and CSI%*

| The value of the CSI   |                |       |       |                |       |       |                 |       |       |                                 |       |       |                                     |                    |                    |  |
|--|----------------|-------|-------|----------------|-------|-------|-----------------|-------|-------|---------------------------------|-------|-------|-------------------------------------|--------------------|--------------------|--|
| n <sub>c</sub> = 168; n <sub>d</sub> = 372; n <sub>p</sub> = 271 |                |       |       |                |       |       |                 |       |       |                                 |       |       |                                     |                    |                    |  |
| Fact<br>or   | W <sub>i</sub> |       |       | C <sub>i</sub> |       |       | W <sub>iw</sub> |       |       | W <sub>iw</sub> *C <sub>i</sub> |       |       | W <sub>iw</sub> *C <sub>i</sub> max |                    |                    |  |
|  | c              | d     | p     | c              | d     | p     | c               | d     | p     | c                               | d     | p     | c                                   | d                  | p                  |  |
| 1.   | 1,92           | 3,92  | 3,2   | 3              | 4,05  | 3,52  | 0,044           | 0,067 | 0,063 | 0,132                           | 0,209 | 0,464 | 0,22                                | 0,34               | 0,77               |  |
| 2.   | 2,91           | 3,85  | 3,58  | 2,89           | 3,68  | 3,7   | 0,067           | 0,068 | 0,057 | 0,194                           | 0,2   | 0,21  | 0,335                               | 0,34               | 0,36               |  |
| 3.   | 2,78           | 2,6   | 2,93  | 2,74           | 3,13  | 3,04  | 0,064           | 0,064 | 0,054 | 0,175                           | 0,196 | 0,164 | 0,32                                | 0,32               | 0,3                |  |
| 4.   | 3,04           | 3,6   | 3,04  | 2,72           | 3,95  | 3,96  | 0,07            | 0,066 | 0,054 | 0,19                            | 0,2   | 0,214 | 0,35                                | 0,33               | 0,39               |  |
| 5.   | 2,5            | 4     | 4     | 3,16           | 4,33  | 3,22  | 0,058           | 0,068 | 0,079 | 0,183                           | 0,219 | 0,254 | 0,29                                | 0,34               | 0,4                |  |
| 6.   | 2,75           | 4,08  | 3,39  | 3,07           | 4,15  | 3,57  | 0,063           | 0,068 | 0,067 | 0,193                           | 0,3   | 0,239 | 0,315                               | 0,34               | 0,39               |  |
| 7.   | 3,39           | 4,25  | 3,76  | 2,4            | 4,25  | 3,92  | 0,078           | 0,069 | 0,047 | 0,187                           | 0,22  | 0,184 | 0,39                                | 0,35               | 0,39               |  |
| 8.   | 3,16           | 4,4   | 3,38  | 2,49           | 4,1   | 3,07  | 0,073           | 0,07  | 0,067 | 0,182                           | 0,223 | 0,206 | 0,365                               | 0,37               | 0,41               |  |
| 9.   | 2,86           | 2,65  | 3,2   | 3,19           | 3,4   | 3,15  | 0,066           | 0,064 | 0,063 | 0,21                            | 0,193 | 0,198 | 0,33                                | 0,32               | 0,37               |  |
| 10.  | 2,74           | 3,98  | 3,21  | 3              | 3,63  | 3,19  | 0,063           | 0,068 | 0,64  | 0,19                            | 0,202 | 0,217 | 0,315                               | 0,34               | 0,36               |  |
| 11.  | 2,51           | 3,93  | 3,17  | 2,86           | 3,88  | 3,76  | 0,058           | 0,069 | 0,063 | 0,166                           | 0,211 | 0,237 | 0,29                                | 0,35               | 0,29               |  |
| 12.  | 2,27           | 3,5   | 2,88  | 3,06           | 4,23  | 3,87  | 0,052           | 0,066 | 0,057 | 0,159                           | 0,208 | 0,221 | 0,26                                | 0,33               | 0,36               |  |
| 13.  | 3,09           | 3,8   | 3,2   | 3,82           | 4,13  | 4,06  | 0,071           | 0,068 | 0,063 | 0,271                           | 0,214 | 0,256 | 0,355                               | 0,34               | 0,34               |  |
| 14.  | 3,86           | 3,7   | 3,92  | 3,98           | 3,58  | 4,27  | 0,09            | 0,067 | 0,078 | 0,358                           | 0,207 | 0,286 | 0,45                                | 0,34               | 0,36               |  |
| 15.  | 3,61           | 3,43  | 3,68  | 3,92           | 3,55  | 4,21  | 0,083           | 0,065 | 0,073 | 0,325                           | 0,188 | 0,307 | 0,415                               | 0,33               | 0,39               |  |
| Σ  | 43,39          | 59,21 | 50,54 | 46,39          | 61,91 | 54,51 | -               | -     | -     | 3,115                           | 3,19  | 3,657 | 5                                   | 5                  | 5                  |  |
| CSI  | -              |       |       |                |       |       |                 |       |       | CSI                             | CSI   | CSI   | CSI <sub>max</sub>                  | CSI <sub>max</sub> | CSI <sub>max</sub> |  |
|  |                |       |       |                |       |       |                 |       |       | 3,115                           | 3,19  | 3,657 | 62,3%                               | 63,8%              | 73,14              |  |

Legend:

c – cyclists,

d – drivers,

p – pedestrians.

Source: Own study based on the survey.



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