SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2024
ORGANIZATION AND MANAGEMENT SERIES NO. 208

METHODOLOGY FOR ASSESSING EMPLOYEE PREDISPOSITIONS TO TYPES OF JOBS IN ORDER TO REDUCE TURNOVER IN MANUFACTURING ENTERPRISES

Bartosz MISIUREK

Wroclaw University of Science and Technology, Faculty of Management; bartosz.misiurek@pwr.edu.pl, ORCID: 0000-0002-0888-7414

Purpose: The article presents an original methodology for assessing employee predispositions to three types of work: manual, manual-machine, and automatic. The aim of the methodology is to reduce employee turnover and improve retention in manufacturing companies.
Design/methodology/approach: The study was conducted on a group of 31 newly employed people in a manufacturing plant in Poland, of whom 11 employees resigned within the first 30 days of employment. The results of the predisposition assessment were analyzed to identify the factors that influence an employee to quit.
Findings: The conclusions indicate that employees with lower predisposition assessment results were more likely to leave the company, while higher results were correlated with greater retention. The original methodology for assessing predispositions, including various aspects of manual, sensory, and logical-analytical work, aims to better match employees to appropriate positions.
Practical implications: The proposed methodology can be applied by HR and production managers to improve hiring and retention in manufacturing. By assessing employee predispositions early on, companies can match individuals to roles better suited to their skills, potentially leading to higher job satisfaction, lower turnover, and reduced recruitment costs. This approach also aids in identifying employees more likely to succeed in specific environments, facilitating better workforce planning.
Originality/value: This unique methodology contributes to improving job satisfaction and reducing turnover costs by aligning employee predispositions with suitable job roles in manufacturing environments.
Keywords: Employee predisposition assessment, Employee retention, Employee turnover.
Category of the paper: Research paper.

1. Introduction

One of the key challenges facing modern manufacturing companies is the effective allocation of employees to appropriate job positions (Bailey, De Propris, 2014; Certa et al., 2009; Martínez-Mora, Merino, 2014; Pal et al., 2014). Studies show that the subjective beliefs of supervisors often lead to discrimination based on gender, age, and physical predispositions, which makes it difficult to objectively allocate employees to appropriate roles (Hamadamin, Atan, 2019). Such stereotypes are common in work environments and can lead to unequal opportunities for certain groups of employees, even though actual competences are not related to these characteristics (Goldenhar et al., 1998; Murrell et al., 1999). Stereotypes about the abilities of women and men to perform manual and physically demanding tasks have been repeatedly debunked in literature (Bayer, 1990; Salah et al., 2023; Schmader et al., 2008; Spencer, 1999; Zemore et al., 2000).

As Peters and Campagnaro (1996) point out, one myth is the belief that manual work requiring precision, such as the finishing of products, is more suitable for women. However, their research shows that there are no statistically significant differences in the manual skills of men and women while taking into account similar physiological characteristics, such as hand size and grip strength. Similarly, the myth that men are better at operating heavy machinery, such as presses, has been dispelled by research. Studies conducted by Cox and Harquail (2009) in manufacturing plants shows that women can achieve some of the best results in this field, indicating that technical skills and training are more important than physical strength, especially if organizations invest in solutions that optimize work.

Research shows that companies need to rely much more on HR data when making hiring decisions. This is because intuitive or stereotypical approaches contribute to increased employee turnover (Gaikwad et al., 2023; Alshammari et al., 2016). Employee turnover generates high costs related to the recruitment and training of new employees, which negatively impacts operational continuity and employee morale (Alshammari et al., 2016). These costs can amount to 50% to 60% of an employee's annual salary, and their impact extends beyond financial issues – including the weakening of organizational culture and the reduction of team effectiveness (WebHR, 2024; TalentUp, 2023). Incorrect assumptions based on intuition or stereotypes lead to employees being assigned to tasks that do not match their actual skills. This approach results in reduced productivity, decreased job satisfaction, and increased employee turnover (Gaikwad et al., 2023; Moon et al., 2022).

Research conducted by Osborne and Hammoud (2017) indicates that high employee turnover significantly destabilizes team dynamics, which in turn leads to lower morale and lower operational efficiency. Employees who see frequent changes in their team may feel both a lack of stability and certainty about the future of their role, which results in lower engagement and a greater propensity to leave the company. This phenomenon is especially visible when

team relationships and the level of trust between employees are disrupted by constant turnover (Wang, Sun, 2023). High turnover can also increase the costs associated with recruiting and training new employees, and cause the loss of key institutional knowledge, which further weakens organizational performance (Yücel, 2021).

To counteract these negative effects, companies should implement talent management strategies, such as investing in employee development, creating a positive work culture, and offering career development opportunities (Boxall, Macky, 2009; Hom et al., 2017). Research suggests that such actions can not only reduce turnover rates, but also improve overall organizational performance, leading to long-term operational success (MDPI, 2021; Workplace Incivility Review, 2023).

The methodology presented in the article for assessing employee predispositions to work is intended to help organizations direct employees to the types of jobs that are most suitable for them, without relying on parameters such as gender, age, or appearance. Such actions are intended to increase job satisfaction in people who are currently employed, which in turn has an influence on greater retention. The methodology has been verified in industry, and this publication presents the conclusions drawn from it.

2. The author's own research conducted in industry

The author's own research, which was conducted in the manufacturing industry at an automotive company, showed that as many as 38.23% of new employees hired in the production area resign from work within the first month. This research was conducted at a plant in Poland on a sample of 863 employees employed in the period between 2021 and 2022. As part of the research, it was verified how many employees resigned from work within the first 30 days of being hired. Out of the group of 863 employees, 330 employees resigned from work in the first 30 days. Figure 1 shows, based on surveys and exit interviews, what the reasons were for these 330 employees leaving.

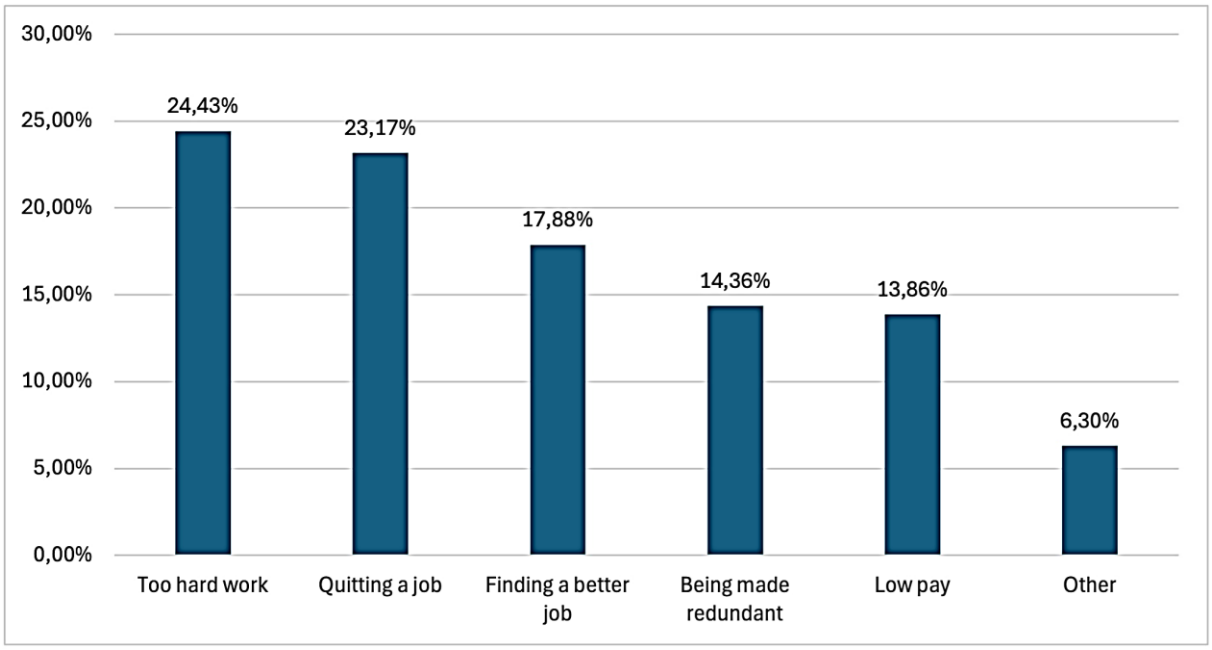

Figure 1. Reasons for employees leaving work.

Source: Authors' own creation.

Reasons such as too much work, quitting the job, or being made redundant by an employer can be associated with the fact that the employee was not properly assigned to the job position, and therefore did not feel satisfied with his job. This research resulted in the development of a methodology that allows for the assessment of employees' predispositions to work in order to direct them to their optimal positions. This paper presents the results of research that was conducted in 2023 after the application of the methodology for assessing predispositions.

High employee turnover is associated with huge costs for organizations, not only financial but also organizational. This is due to the fact that each new recruitment requires the re-training, preparation and onboarding of employees (Kumar et al., 2023). Reports such as the Deloitte Manufacturing Perception Study (2022) show that nearly 83% of manufacturing companies struggle with the problem of attracting and retaining a skilled workforce. These problems result from changing employee expectations and the increase of the competition for talent, both in local and global markets (Hoffman et al., 2020). The lack of appropriate tools for assessing employee predispositions and the shortages of skilled labour lead to costly recruitment processes and reduced engagement, which additionally increases employee turnover (Deloitte, 2022).

3. Types of work in production processes

In research on production processes, three main types of work can be distinguished (Graupp and Wrona, 2016):

- Manual.
- Manual - machine.
- Automatic.

A description of these types of work and their explanation are presented in Table 1. Each of these types of work is crucial for the proper functioning of production and understanding them helps in the appropriate allocation of human resources.

Table 1.
Explanation of the types of work performed by employees in production processes

Type of work	Explanation	Required skills
Manual work	Traditionally associated with tasks requiring precision and dexterity, such as the assembly of small parts or quality control. Manual work is still important in many sectors, especially where flexibility in production, tailored to customer needs, is required.	- Manual dexterity. - Eye-hand coordination. - Perseverance and concentration.
Manual and machine work	Combine manual activities with machine operation. Employees in these types of tasks cooperate with machines - making adjustments or monitoring production processes.	- Sensory skills. - Basic technical knowledge. - Ability to respond to emergencies.
Automatic work	Refers to the supervision of fully automated production lines. Workers in these roles must monitor advanced systems and troubleshoot problems that may arise during the operation of machines. Automation does not eliminate the need for human involvement, especially in the case of more complex tasks that require data analysis or decision-making.	- Logical and analytical skills. - Problem-solving skills. - Knowledge of digital technologies.

Source: Authors' own creation based on: Cohen, Apte, 1997; Graupp, Wrona, 2016; Gustafson, 2013; Kawashimo et al., 2009; Lordan, Josten, 2020; Noor et al., 2021; Rashid, Rötting, 2021.

As part of the developed methodology, tasks were prepared to verify the predispositions of employees to these 3 types of work by checking their skills that are characteristic for a given type of work. Each of these three types of work requires specific skills - from manual and sensory dexterity to analytical and technical skills in automatic work.

4. Methodology for assessing employee predispositions

The methodology for assessing employee predispositions was created to reliably assess employee predispositions and support supervisors in the decision-making process of assigning new employees to specific work positions. This assessment will provide data that will help employers make better decisions about assigning employees to production positions. This will shorten the employee's introduction time to the position, will result in a faster achievement of the required efficiency and quality of work, and will increase team morale, in turn reducing employee turnover. As part of the methodology, eight tasks were prepared, which were matched to three types of work using the weight system (Table 2).

Table 2.
Areas of assessment of employee predispositions

Area		Assigned weight for work type		
		Manual work	**Manual and machine work**	**Automatic work**
1	Precision of work performed using tools	5	2	1
2	Precision of work performed using hands	5	2	1
3	Manual precision	5	1	1
4	Observation skills	3	5	4
5	Ability to read instructions	2	5	4
6	Memorizing sequences	2	5	4
7	Logical thinking test	1	3	5
8	Test of problem-solving and analysis skills	2	2	5
Total		**25**	**25**	**25**

Source: Authors' own creation.

It was assumed that precision tasks are associated with manual work, and tasks related to perception or sensory skills are related to manual-machine work. Logical thinking or the ability to solve problems are given the highest importance for automatic work. It was assumed that all the skills are necessary in each type of work, but not necessarily at the same level, hence the weight system being introduced. The methodology for assessing employee predispositions allows for assessing to which type of work a given employee is best suited for. This assessment recommends the type of work. However, it is worth remembering that an employee may always experience stress during the assessment, which may affect the results. Therefore, in addition to measurements, employee behavior should also be observed, which may help assess their predispositions.

4.1. Time and quality parameters adopted in the methodology

Time and quality parameters are key elements in assessing employee performance (Bryan, Locke, 1967; Zakay, Wooler, 1984). The time parameter refers to the speed of task completion, which helps in assessing work organization, efficiency, and an employee's ability to work under

pressure. In turn, the quality parameter measures how well a task is completed in accordance with quality requirements. This affects the final work result and the organization's productivity. Kerstholt (1994) emphasizes that time pressure can force employees to shorten procedures, which reduces the quality of work. However, properly managed time pressure can increase efficiency without negatively affecting quality, as suggested by Moore and Tenney (2012). Deci et al. (2017) indicate that monitoring both parameters results in better productivity management, higher levels of employee engagement, and better operational results. In the context of manufacturing, Cintrón and Flaniken (2011) suggest that explicit performance evaluation mechanisms that take into account both time and quality help organizations achieve better results. In the research of Na-Nan et al. (2018), it was shown that monitoring time and quality parameters is particularly important in industries such as automotive assembly, where precision and speed are crucial for operational success.

Therefore, when assessing tasks in the proposed methodology, two main aspects were adopted for assessment: the time parameter and the quality parameter. The time parameter determines how quickly an employee is able to perform a given task, which in turn allows for their work organization and efficiency to be assessed. The quality parameter measures the accuracy, correctness and compliance of the performed task with the requirements. Table 3 contains a detailed description of these parameters for each task.

Table 3.
Detailed description of parameters for the prepared tasks, which check work predispositions

Task	Description of the performed task	Time parameter	Quality parameter
Test for precision of work using tools	The employee is required to cut out the two letters 'C' and 'S' in different sizes using scissors.	Time measured from the moment the cutting starts until it is finished. Too long a time may suggest a lack of skill in using tools.	Quality assessment based on the precision of the letter cutting. Product rated as 0 (poor workmanship) or 1 (good workmanship). Attention is paid to the lack of jaggedness and the correct shape.
Test for precision of work using hands	The employee must pull a thread through the eye of a needle and cut it to a specified length.	Time is measured from the moment the thread is touched to the moment it is pulled through the eye of the needle. A shorter time indicates better mastery of the task.	Quality assessment based on the correctness of the thread length measurement. Deviations from the standard (+/- 0.5 cm) reduce the quality assessment.
Test for manual precision	The employee draws patterns without lifting the pen from the paper.	Time is measured for each pattern separately.	Quality assessed by the number of errors – e.g. lifting the pen or leaving a dot.
Test for observation skills	The employee's task is to find the differences between two pictures and label numbers.	Time is measured for each picture and sequence of numbers. A longer time may suggest decreased perceptiveness.	Quality assessment based on the number of correctly found differences and numbers.
Test for the ability to read instructions	Based on instructions, an employee needs to fold two paper airplanes.	Time is measured from the moment the instructions are downloaded to the completion of the airplane.	Quality assessment based on compliance of the made airplane to the pattern in the instructions.

Cont. table 3.

Test for memorizing sequences	The employee has to memorize sequences of shapes, colours and numbers and then reproduce them.	Time is measured for each sequence separately. A shorter time indicates a better working memory.	Quality assessment based on the number of correctly reproduced elements.
Logical test	The employee has to answer logical questions within a specified time.	The time to solve the task is 9 minutes. This time is enough to complete the task and answer correctly.	Quality rating is based on the number of correct answers and errors. Incorrect answers reduce the score.
Test for problem-solving	The employee is meant to answer questions regarding problematic situations in the production process.	Time is measured from the start of the test to its completion. A shorter time means faster problem resolution.	Quality assessment based on the accuracy and completeness of responses. Errors in the analysis lower the score.

Source: Authors' own creation.

In each group of tasks, a maximum of 10 points can be obtained. In the case of failure to meet the quality criterion, the assessment is from 1 to 5 points, and in the case of meeting the quality criterion, the assessment is from 6 to 10 points. The assessment in a given range is influenced by the result related to the time parameter.

4.2. Determining the quality and time parameters for an exemplary task

In order to present how the quality and time parameters for a task are determined, exemplary task number 1 was used: a test for the precision of work using tools. In the case of the qualitative assessment, the guidelines presented in Table 4 were followed, according to which it was recognized whether a given element that was cut out met the quality criterion.

Table 4.
Qualitative evaluation of cutting out elements using scissors

Qualitative assessment	Description of the assessment guidelines
No quality maintained – a maximum score from 1 to 5 points based on completion time	When there are more than 3 white elements of the page outside the outline or there are ragged edges. In the example, there are 4 white elements protruding outside the outline and there are also ragged edges. 
Quality maintained – a maximum score of 6 to 10 points based on the completion time	When there are less than 3 white elements outside the outline and there are no jags or cuts inside the letter. In the example, there is only one white element outside the outline. 

Source: Authors' own creation.

Perceived performance times should be measured based on the skills of the best employees. Table 5 shows the measured performance times for a group of experienced operators.

Table 5.
Scoring for task number 1 - a test for the precision of work using tools - which allows the execution of cutting a given letter with scissors with regards to the cutting time and fulfillment of the quality criterion to be assessed

Scoring basing on time in minutes	1	2	3	4	5	6	7	8	9	10
	A lack of quality					Quality is maintained				
Capital letter „C”	01:21 – >	01:01 – 01:20	00:51 – 01:00	00:41 - 00:50	00:01 – 00:40	01:21 – >	01:01 – 01:20	00:51 – 01:00	00:41 - 00:50	00:01 – 00:40
Capital letter „S”	01:21 – >	01:01 – 01:20	00:51 – 01:00	00:41 - 00:50	00:01 – 00:40	01:21 – >	01:01 – 01:20	00:51 – 01:00	00:41 - 00:50	00:01 – 00:40
Small „C”	01:16 – >	00:56 – 01:15	00:46 – 00:50	00:36 - 00:45	00:01 – 00:35	01:16 – >	00:56 – 01:15	00:46 – 00:50	00:36 - 00:45	00:01 – 00:35
Small „S”	01:16 – >	00:56 – 01:15	00:46 – 00:50	00:36 - 00:45	00:01 – 00:35	01:16 – >	00:56 – 01:15	00:46 – 00:50	00:36 - 00:45	00:01 – 00:35

Source: Authors' own creation.

The maximum score of 10 points means that the employee performed the task correctly, qualitatively, and in a time that was between 1 second and 40 seconds for the capital letters and between 1 second and 35 seconds for the small letters. The final score for a given group of tasks is the average of the scores from four assessments for different sizes of letters.

4.3. Interpretation of the obtained results in the methodology

After conducting the tests to assess the predispositions of employees as part of the job predisposition assessment methodology, results were obtained for three types of work: manual, manual-machine and automatic. Each test is assessed based on previously established criteria, including time and quality parameters. In total, for each type of work, the employee can receive a maximum of 250 points. This value is the result of multiplying the sum of the weights described in Table II, which for each type of work is 25, with a maximum value of 10 points for each group of tasks.

Each task was calibrated to a maximum point value based on the specific requirements for the type of work, which in turn ensures the reliability of the assessment. Table 6 presents the interpretation of the obtained results for each type of work.

Table 6.
Interpretation of the results for each type of work

Result for a given type of work	Interpretation of the obtained result
230-250 points	Outstanding predispositions for a given type of work
210-229 points	Very good predispositions for a given type of work
180-209 points	Good predispositions for a given type of work
160-179 points	Average predispositions for a given type of work
130-159 points	Weak predispositions for a given type of work
25-130 points	Very poor predispositions for a given type of work

Source: Authors' own creation.

Point values allow for the identification of the group of work types to which an employee has the greatest predispositions. It is possible that the results of employees will be similar in the case of different job types. In such a situation, it means that the employee has equal predispositions to several types of tasks, which gives the supervisor more flexibility in the decision-making process. In turn, a low score in all work types may be, among other things, the result of stress during the test. It is recommended to conduct a conversation with the employee in such situations to understand the reasons for the results, and if necessary, repeat the assessment in more favorable conditions.

5. Application of the methodology for assessing predispositions in industry

Research concerning the application of the predisposition assessment methodology in industry were conducted on a group of 31 newly hired employees in a factory in Poland. The research provided interesting results that allow for a better understanding of the mechanisms that influence the decision about resigning from work. From the study group, 11 employees resigned within the first 30 days of employment, which constituted 35.48% of the study population. It is worth emphasizing that the predisposition assessment methodology was not used to make decisions on assigning employees to specific tasks. However, the test results were analyzed post factum to understand what factors could have influenced the employees to leave.

The predisposition tests concerned three types of work: manual, manual-machine and automatic. Each of these types of work required specific skills that were assessed in the predisposition tests. Based on the results of the employees, it was found that those who obtained higher test scores were more likely to stay in the company, while employees with lower scores were more likely to resign from work. The results are presented in Table 7.

Table 7.
The predisposition assessment test results achieved by 31 tested newly recruited employees

Results:	Manual work	Manual-machine work	Automatic work
The average result for the group of 31 people included in the study	169.55	142.39	129.03
The average result for the group of 11 people who quit their jobs in the first 30 days	120.45	105.18	104.63
The average result for the group of 20 people who stayed in their job for more than 30 days	196.55	162.85	142.45

Source: Authors' own creation.

In the case of manual work, those who left scored an average of 120.45 points, while those who stayed more than 30 days scored an average of 196.55 points. These results suggest that those who were less engaged in manual tasks were less willing to work from the very beginning,

and therefore approached the tasks with less energy and commitment. A similar trend was observed in the case of manual-machine work, where employees who left scored an average of 105.18 points, while those who stayed scored an average of 162.85 points. Significant differences in scores were observed in the case of predisposition to automatic work. The employees who stayed with the company scored an average of 142.45 points, while those who left scored only 104.63 points. An interesting observation was that two employees with outstanding predispositions to work on more advanced machines decided to leave, which suggests that the simpler, repetitive tasks assigned to them in production did not meet their expectations. These people scored 172 points and 157 points, respectively. These people confirmed in the „Exit Interview" that their leave was due to the too simple and repetitive tasks to which they were assigned.

The presented results show that people who were not sufficiently engaged in manual tasks scored lower in the predisposition tests. It is worth emphasizing that employees who achieved a low score in all the three types of work may have experienced stress during the tests, which could have affected their results. In such cases, it is recommended to conduct additional interviews to better understand the reasons for the low scores, and also their potential impact on the employee's decision to leave.

6. Conclusions

The conclusions drawn from the research concerning the application of the employee predisposition assessment methodology show that this tool can significantly contribute to improving retention and reducing turnover in manufacturing companies. The results obtained during the implementation of the methodology indicate that employees who are better suited to specific types of work are more likely to stay in the company, which in turn translates into better operational efficiency and lower costs related to recruiting and training new employees.

Analysis of the research results suggests that people who scored high on tests of predisposition for manual, manual-machine or automatic work showed higher levels of engagement and job satisfaction, which had a direct impact on their decision to continue employment. Employees who quit within the first 30 days of employment scored lower on the tests, which in turn suggests that a lack of a proper fit to the tasks may have been one of the key factors for their leaving.

The methodology of assessing employee predispositions enables the precise matching of employees to tasks, which leads to a better allocation of human resources in manufacturing organizations. These results confirm previous hypotheses that employee turnover can be significantly reduced thanks to a better assessment of predispositions at the stage of the recruitment and implementation of new employees. It is therefore concluded that the regular

use of this methodology can significantly affect the optimization of HR processes in manufacturing companies, in turn increasing both operational efficiency and employee satisfaction.

Further research in this area is recommended, especially in the context of the long-term impact of this methodology on employee career development, as well as its application in industries beyond the manufacturing industry. It is also recommended to test this solution and make decisions about whether to hire employees, and for which positions to recommend them. It would then also be necessary to analyze whether employee turnover is reduced. Research in this area will continue.

References

1. Alshammari, M.A., Al Qaied, B.A., Al-Mawali, H., Matalqa, M. (2016). What drives employee's involvement and turnover intentions: Empirical investigation of factors influencing employee involvement and turnover intentions. *International Review of Management and Marketing, Vol. 6, No.* 2, pp. 298-306.
2. Bailey, D., De Propris, L. (2014). Reshoring: Opportunities and Limits for Manufacturing in the UK – the case of the Auto Sector. *Revue d'économie industrielle, 145(1),* pp. 45-61. DOI: 10.4000/rei.5732.
3. Beyer, S. (1999). Gender differences in the accuracy of self-evaluations of performance. *Journal of Personality and Social Psychology, 77(3),* pp. 519-531. DOI: 10.1037/0022-3514.77.3.519.
4. Boxall, P., Macky, K. (2009). Research and theory on high-performance work systems: Progressing the high-involvement stream. *Human Resource Management Journal, Vol. 19, No. 1*, pp. 3-23. DOI: 10.1111/j.1748-8583.2008.00082.
5. Bryan, J.F., Locke, E.A. (1967). Goal setting as a means of increasing motivation. *Journal of Applied Psychology, 51(3)*, pp. 274-277. DOI: 10.1037/h0024566.
6. Certa, A., Enea, M., Galante, G. (2009). Multi-objective human resources allocation in R&D projects planning. *International Journal of Production Research, Vol. 47 No. 13*, pp. 3503-3523.
7. Cintrón, R., Flaniken, F. (2011). Performance Appraisal: A Supervision or Leadership Tool? *International Journal of Business and Social Science, Vol. 2, No. 17*, pp. 29-37.
8. Cohen, M.A., Apte, U.M. (1997). Manufacturing automation. *Production and Operations Management, 6(2)*, pp. 108-126.
9. Cox, T., Harquail, C.V. (2009). The human side of change: Predictors of technical performance in job-related skills. *Journal of Organizational Behavior, Vol. 30, No. 4,* pp. 620-634.

10. Deci, E.L., Olafsen, A.H., Ryan, R.M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, Vol. 4*, pp. 19-43.
11. Deloitte (2022). Competing for talent: Recasting perceptions of manufacturing. Deloitte Insights, available at: https://www2.deloitte.com/us/en/insights/industry/manufacturing/competing-for-manufacturing-talent.html, 8 October 2024.
12. Gaikwad, S.B., Ramya, S.T., Tiwari, T., Tiwari, M., Kumar, B. (2023). Predicting employee turnover: A systematic machine learning approach for resource conservation and workforce stability. *Eng. Proc., Vol. 59 No. 1*, DOI: https://doi.org/10.3390/engproc2023059117.
13. Goldenhar, L.M., Swanson, N.G., Hurrell Jr, J.J., Ruder, A., Deddens, J., (1998). Stressors and adverse outcomes for female construction workers. *Journal of Occupational Health Psychology, 3(1)*, pp. 19-32. DOI: 10.1037/1076-8998.3.1.19
14. Graupp, P., Wrona, R.J. (2016). *The TWI Workbook: Essential Skills for Supervisors*. Productivity Press.
15. Gustafson, A., Schunnesson, H., Galar, D., Kumar, U. (2013). Production and maintenance performance analysis: manual versus semi- automatic LHDs. *Journal of Quality in Maintenance Engineering, Vol. 19, No. 1*, pp. 22-35.
16. Hamadamin, H.H., Atan, T. (2019). The impact of strategic human resource management practices on competitive advantage sustainability: The mediation of human capital development and employee commitment. *Sustainability, Vol. 11, No. 20*, p. 5782, DOI: 10.3390/su11205782.
17. Hoffman, B.J., Shoss, M.K., Wegman, L.A. (2020). The Changing Nature of Work and Workers: An Introduction. In: B.J. Hoffman, M.K. Shoss, L.A. Wegman (eds.), *The Cambridge Handbook of the Changing Nature of Work*. Cambridge: Cambridge University Press, pp. 3-19. DOI: https://doi.org/10.1017/9781108278034.001.
18. Hom, P.W., Lee, T.W., Shaw, J.D., Hausknecht, J.P. (2017). One hundred years of employee turnover theory and research. *Journal of Applied Psychology, Vol. 102, No. 3*, pp. 530-545. DOI: 10.1037/apl0000103.
19. Kawashimo, T., Sato, N., Doyo, D., Anse, M., Tabe, T. (2009). A Skill Transfer Method for Manual Machine Tool Operation Utilizing Cutting Sound. *Human Interface and the Management of Information. Designing Information Environments (Human Interface 2009), Lecture Notes in Computer Science, Vol. 5617*, Springer, pp. 77-86.
20. Kerstholt, J.H. (1994). The effect of time pressure on decision-making behaviour in a dynamic task environment. *Acta Psychologica, Vol. 86, No. 1*, pp. 89-104. DOI: https://doi.org/10.1016/0001-6918(94)90013-2.
21. Kumar, P., Gaikwad, S.B., Ramya, S.T., Tiwari, T., Tiwari, M., Kumar, B. (2023). Predicting Employee Turnover: A Systematic Machine Learning Approach for Resource Conservation and Workforce Stability. *Eng. Proc., 59(1),* p. 117. DOI: https://doi.org/10.3390/engproc2023059117.

22. Lordan, G., Josten, C. (2020). Automation and the changing nature of work. *PLOS ONE*. DOI: 10.1371/journal.pone.0235815
23. Martínez-Mora, C., Merino, F. (2014). Offshoring in the Spanish footwear industry: A return journey? *Journal of Purchasing and Supply Management, 20(4),* pp. 225-237. DOI: 10.1016/j.pursup.2014.07.001.
24. MDPI (2021). *Workplace incivility and turnover intention in organizations: A meta-analytic review*, available at: https://www.mdpi.com, 8 October 2024.
25. Moon, K., Loyalka, P., Bergemann, P., Cohen, J. (2022). The hidden cost of worker turnover: Attributing product reliability to the turnover of factory workers. *Management Science*, available at: https://pubsonline.informs.org/doi/10.1287/mnsc.2021.4079, 8 October 2024.
26. Moore, D.A., Tenney, E.R. (2012). Time pressure, performance, and productivity. *Research on Managing Groups and Teams, Vol. 15*, pp. 305-326.
27. Murrell, A.J., Crosby, F.J., Ely, R.J. (eds.) (1999). *Mentoring Dilemmas: Developmental Relationships Within Multicultural Organizations*. Mahwah, NJ: Psychology Press.
28. Na-Nan, K., Chaiprasit, K., Pukkeeree, P. (2018). Factor analysis-validated comprehensive employee job performance scale. *International Journal of Quality & Reliability Management, Vol. 35, No. 10,* pp. 2436-2449. DOI: https://doi.org/10.1108/IJQRM-06-2017-0117.
29. Noor, H.A.M., Bin Ramli, M.N.S., Kassim, R., Rahman, F.A., Baharum, Z., Salleh, F.I.M. (2021). The Effectiveness of Automated Machine Over Manual Machine in Operational Line. *International Journal of Online & Biomedical Engineering, Vol. 17 No. 12*, p. 19, DOI: 10.3991/ijoe.v17i12.24729.
30. Osborne, S., Hammoud, M.S. (2017). Effective employee engagement in the workplace. *International Journal of Applied Management and Technology, 16(1),* pp. 50-67.
31. Pal, R., Torstensson, H., Mattila, H. (2014). Antecedents of organizational resilience in economic crises—an empirical study of Swedish textile and clothing SMEs. *International Journal of Production Economics, 147(B),* pp. 410-428. DOI: 10.1016/j.ijpe.2013.02.031.
32. Peters, M., Campagnaro, P. (1996). Do women really excel over men in manual dexterity? *Journal of Experimental Psychology: Human Perception and Performance, Vol. 5*, pp. 1107-1112.
33. Rashid, Z., Rötting, M. (2021). Evaluation of manual skill degradation due to automation in apparel manufacturing. *Applied Sciences, 11(23),* 11098. DOI: 10.3390/app112311098
34. Salah, A., Çağlar, D., Zoubi, K. (2023). The impact of production and operations management practices in improving organizational performance: The mediating role of supply chain integration. *Sustainability, Vol. 15 No. 20,* p. 15140, DOI: 10.3390/su152015140.

35. Schmader, T., Johns, M., Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review, 115(2),* pp. 336-356. DOI: 10.1037/0033-295X.115.2.336.
36. Spencer, S.J., Steele, C.M., Quinn, D.M. (1999). Stereotype threat and women's math performance. *Journal of Experimental Social Psychology, 35(1),* pp. 4-28. DOI: 10.1006/jesp.1998.1373.
37. TalentUp (2023). *The cost of employee turnover*. TalentUp Blog, available at: https://www.talentup.io, 8 October 2024.
38. Wang, S., Sun, L. (2023). Does organizational performance affect employee turnover? A reexamination of the turnover-performance relationship. *Public Administration Review*, available at: https://deepblue.lib.umich.edu, 8 October 2024.
39. WebHR (2024). *The true cost of employee turnover*, available at: https://web.hr/blog/true-cost-employee-turnover, 8 October 2024.
40. Yücel, İ. (2021). Transformational leadership and turnover intentions: The mediating role of employee performance during the COVID-19 pandemic. *Administrative Sciences, Vol. 11, No. 3*, p. 81, DOI: https://doi.org/10.3390/admsci11030081.
41. Zakay, D., Wooler, S. (1984). Time pressure, training and decision effectiveness. *Ergonomics, 27(3),* pp. 273-284. DOI: https://doi.org/10.1080/00140138408963489.
42. Zemore, S.E., Fiske, S.T., Kim, H.J. (2000). Gender Stereotypes and the Dynamics of Social Interaction. In: R.K. Unger (Ed.), *The Developmental Social Psychology of Gender* (p. 35). Psychology Press, DOI: 10.4324/9781410605245.