

ERGONOMIC ASPECTS OF WORK MANAGEMENT IN THE CONTEXT OF CHANGING CONDITIONS OF THE EXTERNAL ENVIRONMENT OF ENTERPRISES

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Purpose: The main aim of the article was to examine the impact of changing conditions in the external environment of the enterprise on work management in an ergonomic context.

Design/methodology/approach: As part of the research undertaken in this article, a literature review was carried out on the external environment of enterprises and the ergonomic aspect in work management. Then interviews were also conducted with representatives of large Polish enterprises, through which changes in work organization were discussed, referring to selected aspects of the external environment. Seven cases were examined taking into account the established interview scenario.

Findings: The research results were used to draw general conclusions about the impact of the external environment of companies on the management of ergonomic aspects of work. They also allowed to identify factors that are important from the point of view of planning activities aimed at improving ergonomics at workstations, taking into account changes outside the company.

Research limitations/implications: A limitation of the research undertaken may certainly be the small research sample. The research was designed as a case study but could be extended to other companies. Another direction in the development of the presented research may also be to take into account other groups of external factors that may influence management through ergonomics in enterprises.

Practical implications: The research results may be used in planning ergonomic activities in companies of various industries. Awareness of the influence of external factors on these activities may facilitate their better recognition and inclusion in management processes.

Originality/value: The article focuses on factors in the external environment of the company that may influence the ergonomic aspect of work management. Typically, research focuses on internal factors (especially organizational ones) influencing ergonomic interventions.

Keywords: work management, ergonomic approach, external environment.

Category of the paper: Research paper.

1. Introduction

Shaping ergonomic working conditions is currently the goal of most companies. To achieve it, a number of actions must be taken within the company - from taking into account ergonomics in the technological aspect to adopting appropriate work methods and developing detailed instructions for employees (Thatcher et al., 2018; Lowe, Dempsey, Jones, 2019). This requires knowledge of basic ergonomic principles, appointing appropriate people or units to supervise the implemented activities and undertaking periodic assessments of working conditions according to the criteria adopted in the company (Joshi, Deshpande, 2019). Often, these activities are hindered by a number of barriers that may be related to, for example, employee involvement, the company's management's approach to changes, and the availability of resources that can be used to properly manage ergonomic working conditions (Olabose, Adesanya, Bakare, 2017). Additionally, insufficient knowledge regarding the optimal use of the potential of workstations towards their improvement while implementing ergonomic aspects may also be a barrier (Benmoussa et al., 2019). When considering this factors, it must also be taken into account that not only internal conditions will affect the possibility of implementing ergonomics into work processes. The impact of external factors should also be taken into account, which may seem less important, but on the other hand they should not be ignored in short- and long-term work management planning. They may be influenced by, for example, political and legal changes, technological development or social aspects related to increasing the awareness of the working population (Choppin et al., 2018). It is difficult to imagine implementing ergonomic improvements without knowledge of the latest legal regulations in this area or without taking into account technological progress (also in the context of dynamically developing artificial intelligence) (Kermavnar, Shannon, O'Sullivan, 2021, p. 2; Salmon et al., 2023). For this reason, the implementation of ergonomics in work management should be preceded by an analysis not only of internal factors and possibilities, but also of external aspects affecting the enterprise.

2. The external environment of enterprises as a factor influencing work management

The external environment of an enterprise can be defined as a set of conditions in which its activities take place and which provide it with specific benefits, opportunities and development possibilities. On the other hand, however, the external environment may be a factor generating various barriers to the operation of the enterprise and may also pose threats to its activities, e.g. through the development of competition, emerging new technologies or new legal requirements (Sopińska, 2022; Brychko et al., 2023). The external environment of the company can be divided into several categories, depending on the area affecting the company's operations (Fig. 1).

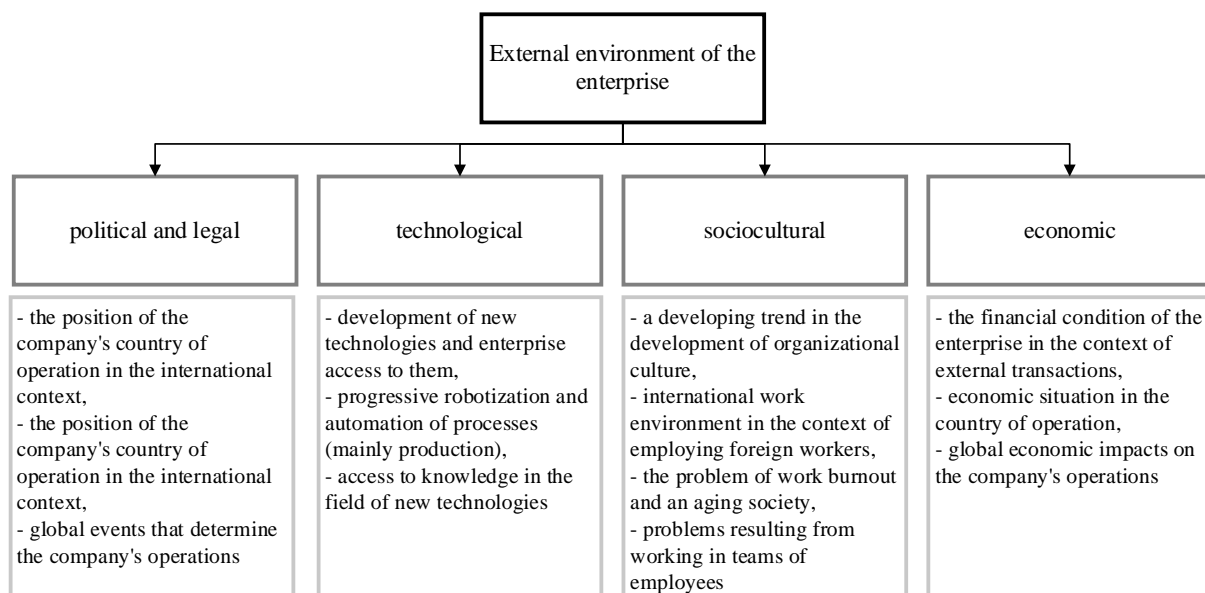


Figure 1. Areas of consideration of the company's external environment.

Source: own elaboration based on: Kowalczyk, 2015; Banham, 2010.

The political and legal environment of the company refers to the international situation in which it conducts its business. Politics may influence, among others: transport and international trade, the flow of information between countries, or the global demand for particular products and services. Legal conditions, however, may define basic guidelines for the operation of the enterprise in various aspects, e.g. employment of employees, production, shaping of workplaces or minimum requirements to ensure safety (Aguilera, Grøgaard, 2019). It is also important to take into account the technological environment - development in this direction is inevitable for the company, but access to new technologies may be difficult (e.g. due to the financial aspect). A delay in the implementation of new technologies may constitute a significant barrier to the development of an enterprise (Haseeb et al., 2019). When considering the external environment of the company, the sociocultural area should also be taken into account, mainly related to the employment of employees, CSR and the culture in which the company operates

(Sikora, 2019, pp. 49-52; Baldini et al., 2018), as well as the economic area (in the sense of the company's capabilities but also related to the economic condition of the country in which it operates) (Centobelli et al., 2020).

The external environment of the enterprise can significantly influence work management in the company. It will determine, for example, the way in which workstations are organized, the implementation of new solutions to optimize work (also in the context of ergonomics and safety) and the organization of production systems (Boatca, Draghici, Carutasu, 2018). It may also cause limitations in work management in the following areas: legal conditions related to the organization of employees' work and opportunities to establish international contacts or international exchange. Failure to take into account the company's external environment in work management may lead to employee dissatisfaction and failure to fully utilize the potential of the company's processes (Distanont, Khongmalai, 2020).

3. Ergonomics in employee work management

Ergonomics is an important factor determining employee work management. Its assumption is to adapt workstations to the psycho-physical capabilities of employees and therefore the implementation of its principles may promote work optimization, but on the other hand, non-ergonomic workstations may lead to employee discomfort and even deterioration of his or her health in the long term (Tosi, 2021; Ewertowski, Berlik, 2020). When considering work from the point of view of the human-machine system, the ergonomic aspect should be taken into account in the following areas of work organization (Susihono, Saputri, 2018; de Visser, Park, Shaw, 2018):

- ensuring appropriate lighting levels and noise reduction in accordance with normative and legal guidelines,
- shaping appropriate climatic conditions, as far as possible, adapting to the ongoing processes (especially production),
- analysis of the posture adopted by the employee while working and making ergonomic assessments; implementing improvements based on the results of these assessments,
- ensuring an appropriate pace of work (taking into account personal factors of employees and ongoing work processes),
- ensuring adequate breaks at work.

The implementation of ergonomics at work stations can be considered in many aspects (Fig. 2).

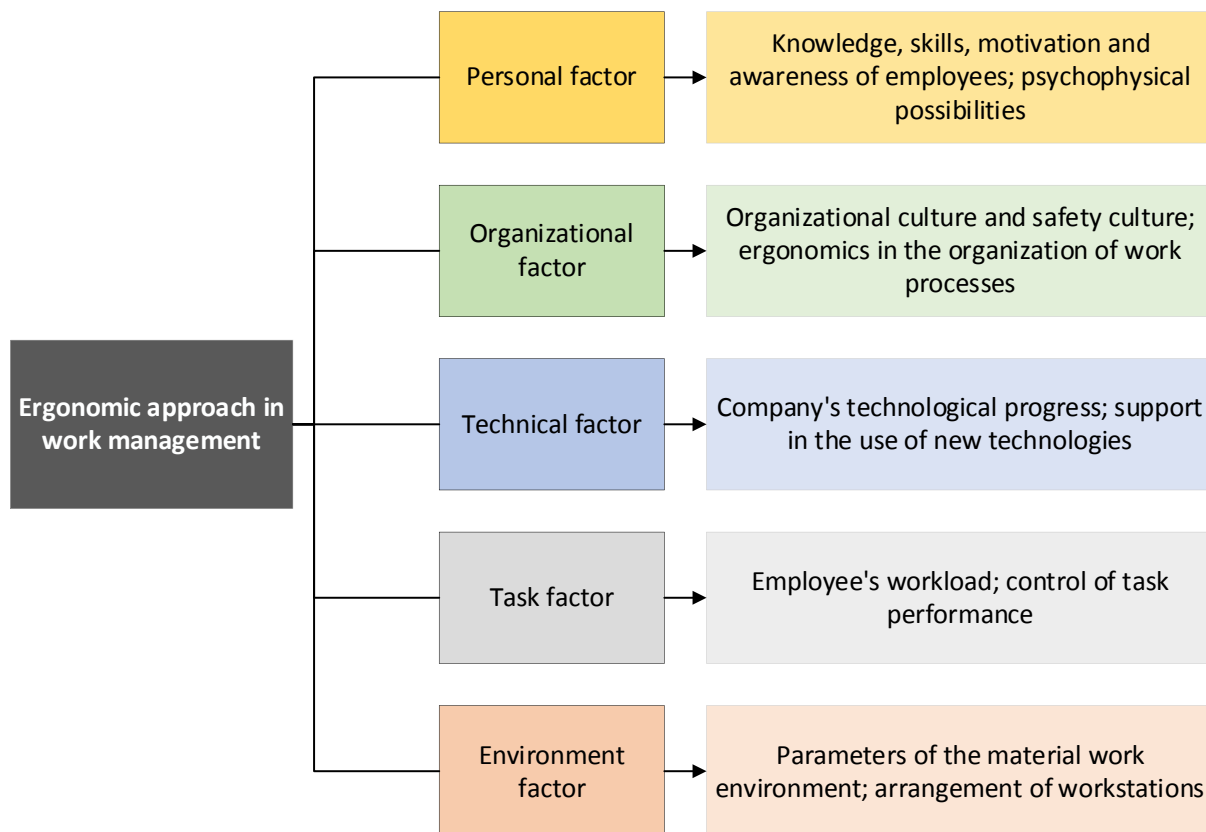


Figure 2. Ergonomic aspects in work organization.

Source: own elaboration based on: Karlton et al., 2017; Realyvásquez, Garcia-Alcaraz, Maldonado, 2018).

Some of the above-mentioned factors will be related to the conditions of the company's external environment. While international legal requirements in the field of ergonomics are not characterized by dynamic variability, such variability can be indicated, for example, in terms of the latest knowledge about the employee's workload and the organization of work tasks or the automation of work processes (Kadir, Broberg, da Conceição, 2019, pp. 4-6). Attention should also be paid to the constantly (and globally) increasing awareness of employees about the importance of ergonomic working conditions for their health and life. This is undoubtedly a factor that will also determine the approach to work organization and will force employers to gradually implement the principles of ergonomics (Olabode, Adesanya, Bakare, 2017, pp. 820-821).

4. Methodological approach

The impact of the external environment of enterprises on their approach to work management in the context of ergonomics was examined using the unstructured interview method, which was conducted with representatives of enterprises who are involved in the

implementation of ergonomic solutions at workplaces (occupational health and safety specialists and ergonomics specialists operating within the enterprise's structures). The areas discussed during the interviews included:

- the type of ergonomic interventions undertaken and their number over the last 5 years (2019-2023) of the company's operation,
- the impact of the external environment on work management in the context of ergonomics, taking into account these aspects in 4 groups of the environment: political and legal, technological, sociocultural, economic,
- opportunities and barriers that are noticed when considering the external environment of the company in the context of its impact on work management from the ergonomic point of view.

As part of the research, 7 cases of enterprises were examined, which were selected deliberately due to selected criteria (therefore, the sample can be considered representative):

1. large enterprise - employing 250 or more employees,
2. undertaking structured ergonomic activities,
3. having a system for monitoring ergonomic activities, recording their implementation, taking into account the adopted criteria for assessing the success of such implementation,
4. identification of the person or organizational unit dealing with ergonomics.

5. Research results

In the first part of the interview, company representatives were asked about the number of registered ergonomic interventions over the last 5 years (the data are presented in Fig. 3). The aim was to determine the scale of ergonomic activities undertaken, but also to track the trend in their implementation, taking into account various aspects of the company's functioning. In the further part of the interview, questions were directed at the relationship between the implementation of ergonomic activities and changes taking place in the external environment of enterprises.

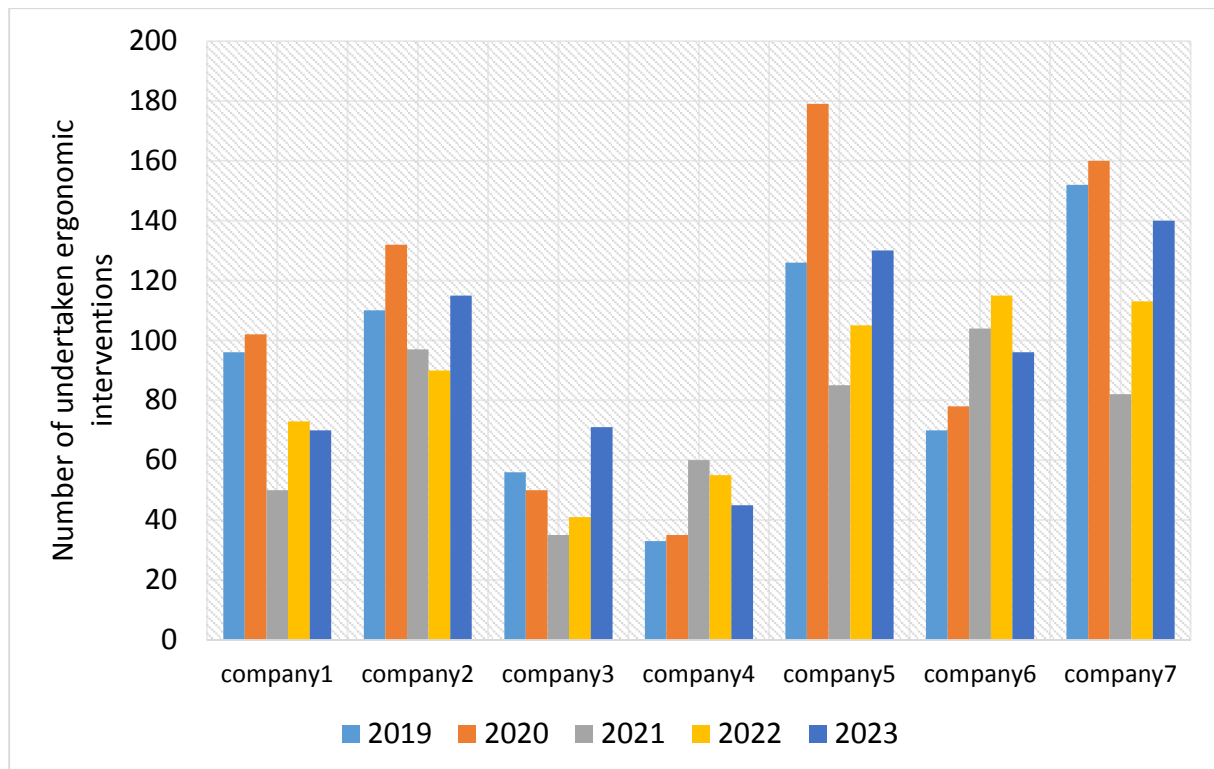


Figure 3. The number of ergonomic activities undertaken in the companies participating in the study.

Source: own elaboration.

Analyzing the chart presented above, it can be noticed that over the course of 5 years (2019-2023), companies were characterized by a variable number of ergonomic activities carried out and registered. A decline in activities undertaken in 2021-2022 can be seen. Attention should also be paid to the number of actions taken in 2023 - none of the companies took the largest number of actions, but an upward trend can be seen compared to the previous two years.

In the second part of the interview, the impact of external environment factors on work management was analyzed with representatives of enterprises, taking into account the ergonomic aspect. The respondents' answers were summarized in Table 1, dividing them into information obtained about the external environment in terms of groups: political and legal, technological, sociocultural and economic.

Table 1.*Summary of interviews with representatives of 7 companies*

External environment Company	Political and legal; Technological; Sociocultural; Economic
1	<ul style="list-style-type: none"> – work management was influenced by changes in legal regulations regarding the performance of manual transport work - many work processes required adaptation to perform lifting activities, partial automation of the process and devices supporting these activities were introduced (which contributed to the improvement of ergonomics), – the pandemic resulted in a reduction in the performance of ergonomic activities and a reduction in the ergonomic budget in the company, – no influence of the external environment in the sociocultural context on ergonomic activities was noticed,
2	<ul style="list-style-type: none"> – work management in the ergonomic context was greatly influenced by the pandemic - a significant decline in activities was recorded, due to the reorganization of work processes and reduced production, the topic of ergonomics was no longer a priority and financial resources for this purpose were also limited, – work management also changed due to the imposition of ergonomic assessments by the foreign branch of the company - this required reassessment at all workstations, – the company implemented automation at several workstations in 2023 (implementation of new technological solutions), which resulted in a change in work organization - training of employees in operating the new production line
3	<ul style="list-style-type: none"> – the impact of the pandemic on ergonomic activities was noticed - fewer of them were carried out than in previous years, – in 2023, there was an increase in activities aimed at increasing ergonomics at work stations due to the project of implementing three new machines (ergonomic assessments were planned in terms of optimal shaping of these work stations), – despite the development of ergonomics in 2023, it was implemented with a limited budget compared to previous years - the outbreak of the war in Ukraine affected company's income (actions taken in the organizational field rather than in the investment field)
4	<ul style="list-style-type: none"> – no impact of the pandemic on the implementation of ergonomic activities in the context of work management was noticed, – no political or legal influence on work management was noticed, – many new technological solutions have not been implemented over the last 5 years (2019-2023), – in the context of the company's external environment, the sociocultural aspect had an impact on work management - the increased employment of employees from other countries resulted in the need to translate internal ergonomic procedures and adapt training in this area to the needs of all employees
5	<ul style="list-style-type: none"> – in 2020, there was a significant development in the field of ergonomics due to the implementation of technological solutions proposed after the implementation of the project in this area (a detailed review of solutions available on the market and newer technologies was carried out), – no impact of the pandemic on work management in terms of ergonomics was noticed, – in 2023, there was a development in work organization due to the change in legal regulations on workstations equipped with screen monitors (there are many positions in the enterprise that need to be adapted), – information campaigns conducted in the company after the pandemic increased employee awareness (which was also intensified by increased awareness in other companies), which also influenced the implementation of ergonomics at work stations
6	<ul style="list-style-type: none"> – the pandemic influenced the implementation of ergonomic measures from a financial perspective, but at that time the company continued to undertake them (use of production downtime), – due to the requirements of the company's external stakeholders, comprehensive ergonomic assessments and more activities were introduced in 2022 in the field of optimal work shaping in workers' stations

Cont. table 1.

7	<ul style="list-style-type: none"> – the pandemic affected work management due to the need to reorganize employees' work shifts and the limited financial possibilities of the company in terms of funds for ergonomic activities, – in 2023, many work stations will need to be adapted to the changed legal regulations on workplaces equipped with screen monitors, – the company has introduced a regular review of available technological solutions, but few of them are implemented due to financial and organizational constraints, – the globally developing trend of increasing employee awareness of the importance of ergonomics prompts the company to take action to implement its principles
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Source: own elaboration.

Due to the need to maintain the readability of the data and to indicate the most important information collected during the interviews, Table 1 presents shortened conclusions from the statements of the company representatives.

6. Discussion and conclusions

Implementing ergonomic principles and solutions in work management in companies requires taking into account many factors. It is obvious that internal conditions and processes will have a very large impact on whether ergonomics can be implemented with satisfactory results. In this respect, the following should be taken into account: the approach of the company's management to this topic, employee involvement and awareness, level of knowledge about ergonomics, planned financial and organizational resources, variability of work processes. Taking into account these aspects determines not only the implementation of ergonomic solutions, but also their acceptance by employees and thus their maintenance.

However, when analyzing the data presented in the above section of the article, attention should also be paid to the impact of the company's external environment on the implementation of ergonomics in work management. From the information provided by the representatives of the chosen enterprises, it can be concluded that this is an important factor determining taking actions in this area, also from the point of view of the possibility of allocating appropriate resources to them. The following external influences on work management in the context of ergonomics were noticed in the surveyed enterprises:

- in the political and legal aspect - changes in legal regulations, e.g. in the context of manual transport work and work stations equipped with screen monitors,
- in the technological aspect - implementation of technologies presented by other companies or implemented after a review of solutions in this area on the market,
- in the sociocultural aspect - the appearance of foreign workers on the labor market and the need to adapt work in this respect,
- in the economic aspect - the general economic situation of the country (which may be the result of the international situation) and its impact on the economic situation of the company.

Taking into account the above factors in work management requires constant monitoring of changes in the company's external environment. It is very important to notice and implement changes in legal regulations, because they determine the basic principles of work organization and failure to comply with them may result in legal consequences for the company. It is also important to follow technological trends in terms of ergonomics - often the solution to a problem occurring in a company may be a solution already implemented in another company. With regard to the sociocultural environment, it is important to track employment trends and employee problems globally and nationally - the employee is the most important element of work organization. The economic aspect is equally important - it will determine the financial resources that can be allocated to ergonomics (some activities do not require them, but many will be possible only with a properly planned budget).

The research presented in this article, which analyzed through interviews cases of enterprises in which ergonomic solutions are implemented in work management, allows drawing preliminary conclusions about the importance of analyzing the external environment in implementing ergonomic solutions in enterprises. Further development of research may include conducting surveys in this area.

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