

Monitoring Stressors in Manufacturing Companies in the Czech Republic

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Abstract: Stress in the workplace is currently on the rise, and it is company employees who encounter stress daily. Companies should therefore actively address this issue. However, the starting point for an optimal solution to stress in the workplace lies in monitoring stressors, which is often overlooked by companies. The main objective of this article is to identify the current state of stressor monitoring in manufacturing companies in the Czech Republic. Data was collected using a questionnaire survey and then processed using descriptive statistics, logistic regression and Fisher's exact test. The analysis found that the state of stressor monitoring in the workplace is critical. The most frequently monitored stressors are workplace relationships, overtime and high workloads. Statistically significant factors influencing the introduction of stressor monitoring in the workplace are the company's participation in a foreign group and the recent introduction of digitalisation elements in the workplace.

Keywords: stressor, monitoring, stress, management, manufacturing industry, digitalisation

JEL Classification: M10, J28

1 Introduction

Stress is an important part of everyone's life and has the power to mobilise the energy needed to deal with the threats and challenges that exist in an individual's environment (Jourmault et al., 2023). Stress is caused by the occurrence of an external stimulus, called a stressor, in the environment in which the individual finds themselves (Rudland et al., 2018, Dartey-Baah et al., 2020).

A stressor is therefore a stimulus that can take many forms and can affect the organisational, social, psychological or physical level (Jasinski & Debris, 2022, Timotius & Octavius, 2022) and can have various origins, such as biological, chemical, microbial, developmental, socio-cultural or environmental (Papathanasiou et al., 2015).

In today's digitalised age, countries are beginning to recognise the importance of protecting their employees from psychological hazards (Chirico et al., 2019, Jain et al., 2022). Some studies present evidence of links between psychological hazards in the workplace and increased levels of stress, depression and anxiety (Jain et al., 2022).

Work stress is linked to job satisfaction, which includes factors such as career advancement, working environment and others. An employee's work performance is thus linked to the work stress they experience, specifically in that the higher the stress level, the worse the work performance. This fact is important not only for the company, but also for various other stakeholders of the company (Ahmad et al., 2021).

There are several common stressors that occur in workplaces, such as work overload, overtime, lack of autonomy, workplace relationships, or toxic work environments. These work stressors can generally be divided into several categories, namely workplace conflicts, relationships with others and career development, physical environment, job role-related stressors, organisational structure, and job characteristics (Gautam & Gautam, 2022).

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Stressors occurring in the workplace thus increase employees' stress levels, which can reduce their overall productivity (Kim & Jung, 2022, Bui et al., 2020). These types of stressors can be referred to as external stressors (Papathanasiou et al., 2015).

According to Eurofound (2023), workload and overtime are the most significant stressors occurring in workplaces in the European Union. On the other hand, job insecurity is among the least frequent.

Currently, businesses are undergoing a wave of automation and digitisation aimed at increasing labour productivity, flexibility and more efficient use of resources, which is also changing the role of workers, who now act as technology operators and multitask more than before. These changes affect not only large companies, but also small and medium-sized enterprises (Körner et al., 2019).

Small and medium-sized enterprises (SMEs) have a firm place in the Czech Republic, as they create jobs for approximately 66.4 % of employees in the Czech Republic. SMEs often bring many benefits, such as job creation at low capital costs (Šebestová & Sroka, 2020).

In the Czech Republic, small and medium-sized enterprises operate with limited resources for stress management compared to large enterprises, making this area very problematic (Soukupová et al., 2024).

2 Methods

The main objective of this paper is to identify prevalent stressors in manufacturing workplaces, followed by an assessment of stressor monitoring in workplaces and identification of the statistical significance of selected company characteristics on stressor monitoring.

In order to identify the factors that lead to good mental health and well-being in people who are exposed to many stressors, it is necessary to monitor these stressors and identify appropriate adaptation processes (Kalisch et al., 2021).

The following research questions have been formulated for the set objectives:

RQ1: What is the current state of stressor monitoring in manufacturing companies?

RQ2: What are the most frequent stressors in manufacturing companies?

RQ3: What factors have a significant impact on stressor monitoring in manufacturing companies?

The results are based on data collected using an electronic questionnaire survey conducted between May and November 2024, by selecting companies from the Orbis database based on their compliance with the conditions for operating in the manufacturing industry according to the CZ-NACE classification and company size, which was determined in accordance with European Commission Recommendation 2003/361, with the main criterion being the number of employees. The e-mail address for receiving the questionnaire also needed to be included.

Managers, executives and owners from approximately 5,200 companies operating in the manufacturing industry in the Czech Republic were approached, with the final sample comprising 371 active entities. The questionnaire included 26 questions divided into 12 sections and the topics of the questions were basic informationa about the company, stressors, stress management interventions and digitalization. These questions were mainly closed or semi-closed, single-choice or multiple-choice. The questionnaire was piloted on 5 managers, which ensured the correct formulation of questions and clarity of the questionnaire.

The sample surveyed includes micro-enterprises (94), small enterprises (123), medium-sized enterprises (117) and large enterprises (37).

Table 1 shows the criteria for classifying enterprises according to European Commission Recommendation 2003/361.

Table1 Definition of SMEs

Enterprise size	Number of employees	Turnover	Balance sheet
Microenterprise	<10	<2 million EUR	<2 million EUR
Small enterprise	<50	<10 million EUR	<10 million EUR
Medium-sized enterprise	<250	<50 million EUR	<43 million EUR

Source: European Commission (2003)

The main part of the questionnaire survey consists of questions concerning the occurrence of stressors, stressor monitoring and factors that influence stressor monitoring in companies. Descriptive statistics, logistic regression and

Fisher's exact test were used for data analysis. The questionnaire survey was constructed based on literature studied from the Web of Science and Scopus platforms.

Logistic regression was first performed to evaluate the influence of selected factors on stressor monitoring in the workplace. The selected factors include company size, company participation in a foreign group, and whether the company has digitised in the last year.

The following hypotheses were established:

$H_{0(A)}$: Company size does not affect the likelihood of stressor monitoring in the company.

$H_{0(B)}$: The company's participation in a foreign group does not affect the likelihood of stressor monitoring in the company.

$H_{0(C)}$: The introduction of digitalization elements in the company does not affect the likelihood of stressor monitoring in the company.

Fisher's exact test was used for the subsequent evaluation of the relationship between the selected factor and stressor monitoring.

The following hypotheses were established:

$H_{0(D)}$: There is no correlation between a company's participation in a foreign group and stressor monitoring within the company.

$H_{0(E)}$: There is no correlation between the introduction of digitalization elements in the company and stressor monitoring in the company.

Lai et al. (2015) argue that stressor monitoring and work stress are not statistically significantly affected by company size. Conversely, Cijan et al. (2019) say that the introduction of digitalisation elements in the workplace is a statistically significant factor for stressor monitoring that could influence this factor. As for the factor of a company's participation in a foreign group, Gabel-Shemueli et al. (2018) cite this factor as statistically significant for stressor monitoring, noting that it is precisely in an environment such as a company participating in a foreign group that unique interactions and group dynamics arise, producing more stressors in the workplace.

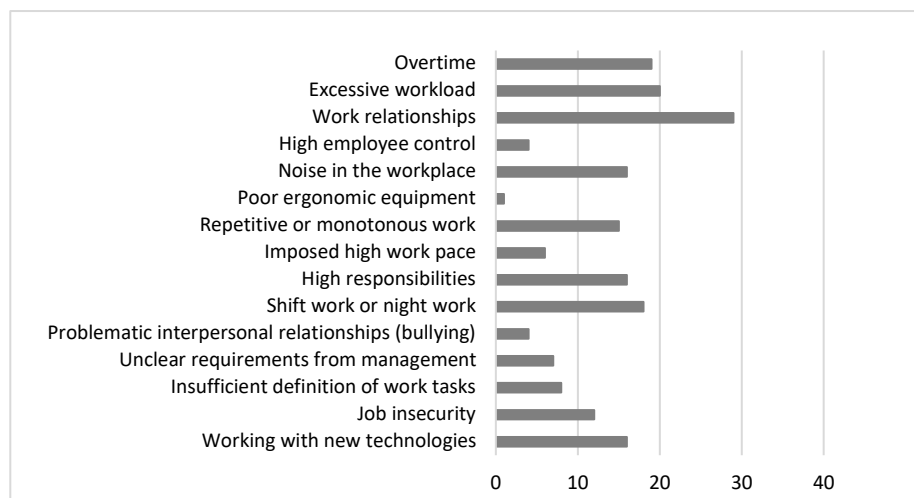
3 Research results

In general, the research has shown that monitoring stressors in manufacturing workplaces is relatively uncommon. Only 13.5 % of companies in the sample have stressor monitoring in place.

Companies most often monitor stressors through interviews with employees (62 %), observation (54 %) or group meetings (46 %). In terms of company size, large companies monitor stressors in the workplace most often (27.02 %) and microenterprises least often (8.51 %).

The following graph shows the most frequent stressors. The graph shows the number of companies that reported the occurrence of this stressor.

Figure 1 Frequency of stressors at workplaces of manufacturing companies



Source: own processing

According to the research conducted, the most frequent stressor in manufacturing workplaces is workplace relationships, which are reported across all categories of enterprises. Furthermore, for micro and small enterprises, significant stressors include excessive workload, high levels of responsibility and noise in the workplace. Small enterprises also report working with new technologies and shift work as significant stressors. For medium-sized enterprises, overtime and repetitive work are significant, while large enterprises report shift work and overtime.

According to Jasinski and Debris (2022) the most frequented stressors could include excessive workload, organizational restrictions or work relationships. This agrees with the results of this paper. On the other hand Eurofound (2023) is describing frequent stressors in the EU workforce: intensity of workload and overtime. Which is also in agreement with this paper.

Logistic regression was first used to determine the statistical significance of selected company characteristics on the implementation of stressor monitoring in companies.

Table 2: Logistic regression for the influence of selected factors on stressor monitoring in manufacturing companies in the Czech Republic

Variable	P-value	Estimate
Intercept	0.02	0.07
Small company	0.522	-0.02
Medium company	0.434	0.03
Large company	0.618	0.03
Participation in a foreign group	0.018	0.12
Recent digitization of the company	0.008	0.11

Source: own processing

The following hypotheses will be evaluated based on logistic regression:

$H_{0(A)}$: The size of the enterprise has no effect on the probability of monitoring stressors in the enterprise.

$H_{0(B)}$: The company's participation in a foreign group does not affect the probability of stressor monitoring in the company.

$H_{0(C)}$: The introduction of digitalisation elements in a company does not affect the probability of monitoring stressors in the company.

For individual categories, the p-values according to logistic regression were as follows: small enterprise ($p=0.5229$), medium-sized enterprise ($p=0.4346$), large enterprise ($p=0.6181$), enterprise participation in a foreign group ($p=0.0183$) and introduction of digitalisation elements ($p=0.0088$).

According to the p-values determined by logistic regression, it is possible to reject only the null hypotheses $H_{0(B)}$ and $H_{0(C)}$ in favour of the alternative hypotheses at a significance level of 5 %. The null hypothesis $H_{0(A)}$ in favour of the alternative hypothesis cannot be rejected at a significance level of 5 %.

By converting the estimate to odds ratio, an odds ratio of 2.42 was determined for the factor "company participation in a foreign group" and an odds ratio of 2.35 for the factor "introduction of digitalisation elements in the company".

Fisher's exact test was used for statistically significant factors, which indicates the statistical significance of the relationship between the selected factor and the monitoring of stressors in the workplace.

Table 3: Fisher's exact test for the influence of selected factors on stressor monitoring in manufacturing companies in the Czech Republic

Test characteristics	Factor $H_{0(D)}$	Factor $H_{0(E)}$
P-value	0.002	0.0008
Odds Ratio	2.9514	2.8841

Source: own processing

The following hypotheses were established for this test:

$H_{0(D)}$: There is no correlation between a company's participation in a foreign group and the monitoring of stressors within the company.

$H_{0(E)}$: There is no correlation between the introduction of digitalisation elements in the company and the monitoring of stressors in the company.

Based on the results of Fisher's exact test, the hypotheses can be evaluated as follows:

The null hypothesis $H_{0(D)}$ can be rejected at a 5 % significance level based on a p-value of 0.0029 in favour of the alternative hypothesis. The null hypothesis $H_{0(E)}$ can be rejected at a 5 % significance level based on a p-value of 0.0008 in favour of the alternative hypothesis.

4 Conclusions

The main objective of this paper is to analyse and evaluate the current state of stressor monitoring in manufacturing companies as a basis for the subsequent optimal implementation of stress management interventions. The achievement of this objective was determined by three research questions concerning the current state of stressor monitoring, the most frequent stressors, and the impact of selected factors on the implementation of stressor monitoring in companies.

It was found that stressor monitoring in manufacturing companies is in a critical state and many companies do not implement stressor monitoring.

However, companies that do implement stressor monitoring do so using basic tools such as questionnaires or interviews. They see workplace relationships, overtime, and high workloads as the most frequent stressors. It was also pointed out that the frequency of individual stressors varies greatly depending on the size category of the company. However, the biggest problem that occurs across all categories is workplace relationships.

In terms of factors influencing the implementation of stressor monitoring in the workplace, it was found that the size of the company does not have a statistically significant effect, but the company's participation in a foreign group and the recent introduction of digitalisation increases the odds ratio of the probability of introducing and operating stressor monitoring in the workplace.

Within the framework of the specified null hypotheses for logistic regression, it was possible to reject the alternative hypotheses $H_{0(B)}$ and $H_{0(C)}$. In Fisher's exact test, it was possible to reject $H_{0(D)}$ and $H_{0(E)}$. It can therefore be argued that the selected factors related to the rejected null hypotheses have a statistically significant impact on stressor monitoring.

In terms of the limitations of this research, it should be noted that the logistic regression included only selected characteristics and that many other factors may influence stressor monitoring in companies. The research focused on the manufacturing industry in general, but there are many sectors within this industry, and each sector may have its own specific stressors and may approach stressor monitoring differently.

Further research in this area could therefore include a detailed analysis of individual manufacturing sectors and their differences. It could also include an analysis of companies that do not monitor stressors, which constitute the majority in this research, analysing why these companies do not want to monitor stressors and what percentage of these companies implement stress management without monitoring stressors.

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