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Robotization of Work - What Are the Experiences Among Employees in Automotive Industry Company in the Czech Republic

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ABSTRACT

New technologies, such as advanced robotic systems, have led to a renewed debate on the impact of automation on occupational safety and health. The present research aimed to map how employees perceive robotics in their work activities and what impact the introduction of robots has on their mental health. Due to the nature of the study, it is an exploratory research with a qualitative design. Content analysis was used to analyze the data. The main method of data collection was unstructured and semi-structured interviews with managers and other employees of the automotive industry company. Unstructured interviews were first held with 3 managers (technical manager, health and safety manager, and HR manager) and then semi-structured interviews were held with 6 production operators, 1 shift leader, and 1 technical worker. The interviews were conducted with 7 women and 1 man in the age range of 35–60 years. The analysis of the interviews yielded 9 outcome themes: general perceptions of robotization; change; problems; support at work at the beginning of robot introduction and current support; social relations and communication; employee characteristics; physical and mental health. The results of the interviews showed the importance and relevance of the topic for both the management and employees. Initially, the introduction of robots is associated with several problems, but these are gradually turned into benefits and make employees' work easier. The greatest psychological stress is associated with the work of technical staff and managers. Findings from this study suggest the importance of support in terms of adequate and easy-to-understand training and also supportive leadership. The characteristics of the employee who is collaborating and cooperating with robots in the company studied were unique – not highly educated but very skilled and proactive. It also seems that company culture and managerial support are necessary to create a healthy and successful organization.

Keywords: Robotisation, Employee mental health, Corporate culture

INTRODUCTION

The appearance of new technologies, such as advanced robotic systems that can closely interact with humans, has led to a revival of the debate on

the automation potential of jobs and tasks as well as their consequences on occupational safety and health (EU-OSHA, 2018). There are concerns that the nature and organization of work, as well as employment status, will change considerably. There could be a significant loss in medium-skilled jobs and a significant increase in higher-skilled jobs. The workforce is expected to become more diverse and dispersed, changing jobs frequently and working online rather than in person. All of this will bring challenges and opportunities, including in the area of OSH (EU-OSHA, 2018). An increase in robot exposure at work reduces work-related injuries, but there could be an increase in mental health problems (Gihleb, Giuntella, Stella, & Wang, 2022). Some evidence shows lowering effects on job physical intensity and disability, but no evidence of significant effects on mental health and work and life satisfaction (Gihleb, Giuntella, Stella, & Wang, 2022). Also inconclusive are data about either replacing workers with robots or making their working tasks more responsible and causing more psychosocial stress (Leso, Fontana, & Iavicoli, 2018). Also, the phenomenon of digital stress has arisen, its main components are stress and digital technologies. Digital stress can negatively affect individual physiological well-being, user satisfaction, or individual performance at work (Fischer, 2021).

Mental health is also affected by other factors: the error rate of robots (O'Driscoll, Brough, Timms, & Sawang, 2010); technical problems such as breakdowns or slowdowns (Körner et al., 2019); increasing requirements for employee competencies (Cascio & Montealegre, 2016); increased need to react quickly to emerging problems (Dvash & Mannheim, 2001) and, last but not least, wary about one's job (De Vries, Gentile, & Wacker, 2020). Thus, employees may experience increased stress, anxiety, frustration, increased cognitive load (Gihleb, Giuntella, Stella, & Wang, 2022; Dvash & Mannheim, 2001), or an increase in the use of addictive substances (Gihleb, Giuntella, Stella, & Wang, 2022).

Possible interventions that can be implemented to enhance both technological engagement and workers' well-being consist primarily of training, supporting, and developing an organizational culture and climate that fosters technological change, at the same time recognizing the needs of individual workers and the importance of maintaining their well-being (O'Driscoll, Brough, Timms, & Sawang, 2010).

METHODS

Considering the research objective, qualitative research was chosen using the methods of unstructured and semi-structured interviews. Data collection took place in the automotive industry company. Collaborative robots (cobots) were used in this company. The robotization process started in 2017 and the company saw a reduction in the number of employees from 1,600 to 600. Robotization helped with lowering the risks at work (chemical hazards and physical load). Unstructured interviews were first held with 3 managers (technical manager, health and safety manager, and HR manager), and then semi-structured interviews were held with 6 production operators, 1 shift

leader, and 1 technical worker. The interviews took place with 7 women and 1 man in the age range of 35–60 years.

The interviews took place in reserved rooms during their working hours. Due to operational limitations, it was not possible to record the interviews, so they were written down in real-time. An informed consent was always signed before the actual data collection.

Transcripts from individual interviews were used for data analysis. These texts were repeatedly read by analyzers, who highlighted important sections of the texts. Subsequently, open and axial coding was used. As part of open coding, text sequences were divided into units to which codes were assigned. Within the axial coding, mutual connections and relationships were sought between the codes until the resulting coding system was created. The emerging system of codes was regularly discussed at analyzer meetings. After analyzing the individual interviews, common themes were identified. In the end, the obtained data were interpreted.

Data collection took place in August 2023.

RESULTS

Unstructured Interviews

Managers agree that the introduction of robots affects the culture of the entire company. The company must get ready for the robotization process in advance. Concerning operators, they describe that the recruitment process is more focused on commited, flexible, and technically educated employees. Among existing employees, proactivity and responsibility are also key characteristics.

Semi-Structured Interviews

By analyzing the interviews, 9 resulting themes were identified. In the beginning, we present a list of basic topics and their subtopics:

- General perception
- Change
- Fear
- Problems
- Support (training and current support)
- Social relations and communication
- Characteristics of the employee
- Physical health
- Mental health (stress, fatigue, cognitive functions, memory and attention, abuse).

General Perception

The general perception of robotization in companies is positive for multi-member employees. Employees evaluate robots positively - they make their work easier, especially physically.

Change

The introduction of robotization in the company is a big change in all directions. The employees mainly saw a change in the reduction of physical demands.

Fear

Most employees are not afraid of working with robots. Everyone is trained and knows exactly what they can and cannot do with the robots. Some respondents spoke of a healthy respect for machines and new technology.

Problems

The biggest problems with robotization are often connected with their introduction into the process. Consequently, the most common problems are connected with the supplied material rather than with the work of the robots themselves.

Support

Employees rate the training they received as sufficient, simple, and effective. The most important for production operators is to know the basic principles of working with robots, where they can and cannot intervene. It is also useful for them to know what the most common problems are and how to solve them.

Social Relations and Communication

Almost all employees agreed that social relations and communication have not changed significantly due to robotization.

Characteristics of the Employee

The employees more or less agree that no specific skills or education are needed to work as a production operator. In interviews, it is often mentioned that an employee suitable for working with robots should first of all want to work with robots and also be willing to learn new things.

Physical Health

Participants often stated that the introduction of robots significantly reduced physical demands and therefore pain and strain on their arms and hands.

Mental Health

Most respondents generally do not consider their work stressful. They only feel a greater degree of stress in situations where problems with robots occur. Also, most respondents perceive working with robots as less tiring for them. The interviewees did not mention increased demands on memory processes. They did not observe the effect of robotization on memory, attention, sleep patterns, or addictive behavior.

DISCUSSION

The introduction of robotization in companies brings with it significant changes that affect health and safety. Protection of workers from excessive physical load or other work hazards is the main positive outcome of our research and similar other research (Gihleb, Giuntella, Stella & Wang, 2022; Ishida, Tanaka, Taniguchi & Moriizumi, 2006).

The results regarding the impact on psychological health are not that clear-cut. According to this study, employees experience the highest level of stress when introducing new robots, which entails many changes, technical problems, or learning new procedures. According to other authors, these factors are also, significant stressors when working with robots (O'Driscoll, Brough, Timms & Sawang, 2010; Körner et al., 2019; Dvash & Mannheim, 2001). However, after the initial problems, most of the employees are satisfied and perceive the involvement of robots in the production process positively. Managers, who communicate with employees and constantly explain the positive effects for themselves, have a lot to do with this.

The production operators themselves perceived that the training was trouble-free and simple, and the support they receive is adequate and helpful. This can be the result of an already set up system of education and training at the given workplace, optimally set communication, and satisfactory organization of work. This finding is in line with other authors (O'Driscoll, Brough, Timms & Sawang, 2010).

Some research (Lu, Xie, Wang, Li & Xu, 2022) also speaks of increased psychological stress that results from the fear of robots or the possible unpredictability of the situation when working with them. Despite this, most of the probands in the presented research do not fear or worry about robots. They are well-trained and follow safety guidelines to protect their health. Rather than fear, they spoke of a healthy respect for robots.

The presented study came to the conclusion that managers are the most psychologically threatened by robotization. They have to communicate with employees about the change and process and constantly explain the desired positive effects. Technical workers or shift leaders are those, whose training is very demanding and requires significantly more time in comparison with the training of operators.

From the present research study, as well as other similar studies (Murashov, Hearl & Howard, 2016; Adem, Çakit & Dağdeviren, 2020), the recommendation is to change corporate culture and work with human resources.

The current research is the first of its kind in the Czech Republic and brings with it many limitations. The first of them is the relatively small sample of respondents, which consisted of employees who still work with robots. We do not have any information from people who may have been negatively affected by robotization, *e.g.,* by losing their jobs. The company joined the project voluntarily and was motivated to lead good practice. The biggest technical limitation was the impossibility of recording individual interviews. Some other important information may have been lost in the real-time transcription.

CONCLUSION

Advanced robotic systems at work have led to a renewed debate on the impact of automation on occupational safety and health. The present research aimed to map how employees perceive robotics in their work activities and what impact the introduction of robots has on their mental health.

The current research is the first of its kind in the Czech Republic and brings with it many limitations. The conclusions show that employees experience the highest level of stress when introducing new robots, which entails many changes, technical problems, or learning new procedures. However, after the initial problems, most of the employees are satisfied and perceive the involvement of robots in the production process positively.

Production operators in the research did not experience any significant changes in stress, work pressure, frustration, or cognitive load. All of them said that working with robots does not affect their sleep or addictive behaviors.

Findings from this study suggest the importance of support in terms of adequate and easy-to-understand training and also supportive leadership. The characteristics of the employee who is collaborating and cooperating with robots in the studied company were unique – not highly educated but very skilled and proactive. It also seems that company culture and managerial support are necessary to create a healthy and successful organization.

It is therefore important to continue with further research and professional discussion to better understand the impact of robotization on companies and their employees and thus be able to take full advantage of its benefits and minimize negative impacts.

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