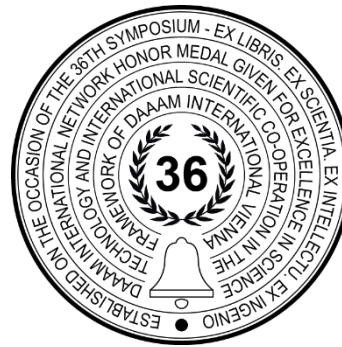


TRANSFORMATION OF HR AREAS AS A RESULT OF DIGITIZATION AND AUTOMATION: ANALYSIS AND FINDINGS

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Abstract

Digitalization and automation are currently ones of the main trends transforming the functioning of industrial enterprises. These changes significantly affect not only production processes, but increasingly affect also the areas of human resource management. Technologies such as electronic recruitment tools, e-learning platforms, performance evaluation software, and automated administrative systems are changing the way organizations work with employees throughout the entire work life cycle. The aim of the article is to present the results of a quantitative survey conducted in industrial enterprises in Slovakia, which analyses the extent to which individual HR (human resource) areas have been affected by digitalization and automation. The article presents the results of a questionnaire survey, in which participated 177 respondents from large and medium-sized industrial enterprises in Slovakia. The results of the survey also revealed areas in which employees at various levels of organizational hierarchy perceive the greatest potential for further use of modern technologies within human resource management. Areas of human resource management where the implemented digitalization has contributed to their improvement were also identified.

Keywords: automation; digitization; employees; HR; industrial enterprises

1. Introduction and Theoretical Background

Digitalization and automation in industrial enterprises encompass a complex interplay of digital transformation, technology adoption, and the challenges we face during this transition. Understanding these topics is crucial for enterprises that want to navigate effectively in the evolving industrial environment. Digital transformation is an evolutionary process that optimizes organizational capabilities to leverage digital technologies, which has a significant impact on manufacturing sectors. The rise of smart manufacturing technologies is revolutionizing the manufacturing environment and increasing interest in digital transformation [1]. Companies are increasingly focusing on automating industrial processes and creating intelligent, connected manufacturing systems [2]. Today's society is strongly influenced by the development and implementation of modern information and communication technologies [3]. Organizations face significant challenges in acquiring the necessary knowledge and technical skills to effectively implement new digital technologies.

Despite the challenges, digitalization presents opportunities for radical and incremental process innovations that increase competitiveness [4]. From an innovation perspective, the essence of digitalization and automation lies in the development of advanced technologies aimed at achieving savings in processes, products or services [5]. Digital transformation in human resources (HR) is essential to maintain competitiveness, especially in the wake of the pandemic, which has accelerated the adoption of digital HR technologies [6]. The integration of e-HRM (electronic human resource management) facilitates better service delivery to employees and managers and streamlines human resource operations [7] [8]. Organizations are being urged to modernize their HR functions to optimize processes and improve the overall employee experience [9]. The pandemic has accelerated the transformation of human resource management, highlighting the importance of digital tools to remain competitive in a rapidly changing environment. The digitalization of human resources is seen as a revolutionary opportunity to change corporate strategies and culture, emphasizing the importance of continuous learning and adaptation [10]. Digital HR processes involve implementing selection, training, and evaluation functions using advanced digital technologies, thereby increasing efficiency and effectiveness [11].

In summary, digitalization and automation are significantly impacting the HR area by transforming HR processes, influencing workforce dynamics, and evolving the competencies required of HR professionals. These changes require strategic adjustments to ensure that organizations can effectively manage the challenges and opportunities presented by the digital age.

2. Materials and Methods

The main aim of the article is to present the results of a quantitative survey conducted in industrial enterprises in Slovakia, which analysed the extent to which individual HR areas have been affected by digitalization and automation. For the purpose of data collection, a questionnaire was designed and filled out by respondents in various job positions in medium-sized and large enterprises in Slovakia. Large and medium-sized enterprises in particular face significant challenges in the field of digitalization due to barriers to technology adoption and a lack of necessary skills. Data collection took place from February 11, 2025, to May 26, 2025. The questionnaire also identified areas in which respondents in various job positions perceive the greatest potential for further use of modern technologies in human resource management. To meet the main objective of the article, three research questions were set:

- **Research question 1:** Which areas of human resource management have been affected by automation and digitalization and the leveraging of new technologies?
- **Research question 2:** In which areas of human resource management do respondents see the greatest scope for using automation and digitalization?
- **Research question 3:** How have been improved processes of human resource management if digitalization of these processes was implemented?

The following Fig. 1 and Table 1 contain the basic characteristics of the respondents of the questionnaire survey.

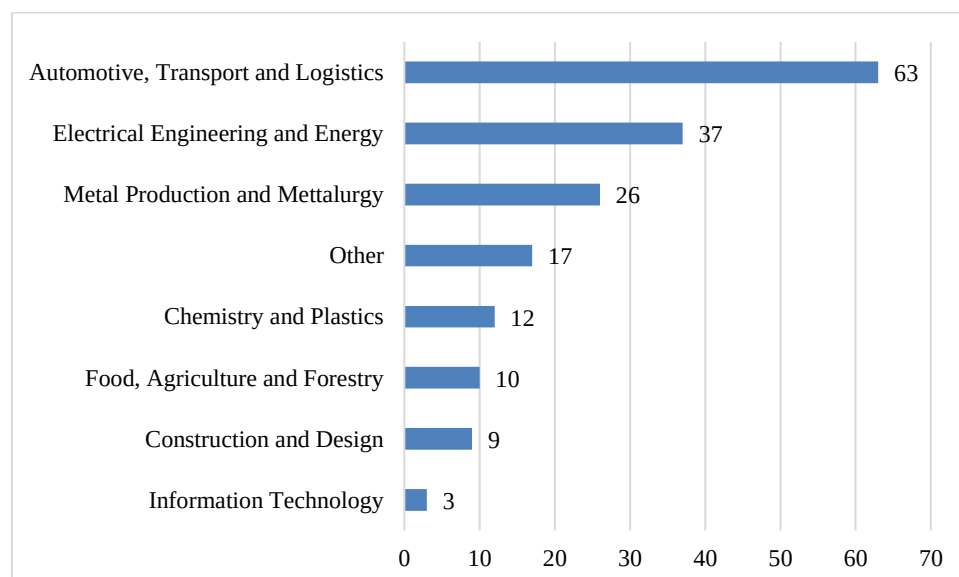


Fig. 1. Characteristics of respondents from the perspective of sector affiliation (own elaboration, 2025)

Fig. 1 shows the characteristics of respondents by industry sector in which they operate. The largest share of respondents comes from the automotive, transport and logistics sector, which represents 63 responses, making it the largest group. This is followed by electrical engineering and energy with 37 respondents and metallurgy and metallurgy with 26 responses. Other sectors are represented to a lesser extent.

Respondents	Automotive, Transport and Logistics	Electrical Engineering and Energy	Chemistry and Plastics	Information Technology	Food, Agriculture and Forestry	Construction and Design	Metal Production and Metallurgy	Other
Gender								
Male	37	28	7	0	5	3	17	8
Female	26	9	5	3	5	6	9	9
Job position								
Production position	14	4	6	0	2	0	2	3
Administrative position	14	11	4	0	3	6	9	8
Employee specialist	22	14	1	3	1	2	8	3
Managerial position	13	8	1	0	4	1	7	3
Education level								
Secondary school without diploma	3	1	2	0	1	0	3	2
Secondary school with diploma	26	15	5	1	3	2	7	6
University level 1	15	8	3	1	0	1	6	6
University level 2	18	12	2	1	6	4	9	2
University level 3	1	1	0	0	0	2	1	1
Age								
21 - 30	18	12	5	3	3	1	4	6
31 - 40	19	13	0	0	1	4	8	3
41 - 50	20	10	2	0	2	2	9	4
51 - 60	6	0	5	0	3	2	4	4
> 61	0	2	0	0	1	0	1	0

Table 1. Characteristics of respondents in terms of gender, job position, education level and age (own elaboration, 2025)

Table 1 provides a detailed overview of respondents by gender, job title, education and age in individual sectors. Majority of respondents were men, especially in the automotive and energy sectors. Specialists and administrative employees are most frequently represented job positions, with a significant share also being managers. In terms of education, secondary education with a high school diploma and a second-level university education prevail. Most numerous age group is respondents aged 31 - 50, which indicates an active working population in industry in middle age.

3. Results and Discussion

This section of the article deals with the analysis of the three research questions that were set out in the previous section. The research questions were analysed using IBM SPSS software. The results are presented using descriptive statistics, tables and graphs in absolute frequencies.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Recruitment and selection of employees	177	0	5	1.92	1.494
Employee adaptation and onboarding	177	0	5	1.95	1.538
Employee training and development	177	0	5	3.01	1.394
Employee performance evaluation	177	0	5	2.66	1.515
Career planning and talent management	177	0	5	2.18	1.485
Administration (employment contracts, attendance records, ...)	177	0	5	3.32	1.481
Internal communication (within the organization)	177	0	5	3.36	1.459
External communication (e.g. with customers)	177	0	5	3.05	1.609
Employee motivation	177	0	5	2.19	1.429
Presence at the workplace (e.g. home office)	177	0	5	2.82	1.599
Work-life balance	177	0	5	2.16	1.441
Valid N (listwise)	177				

Table 2. Result of RQ1 analysis (own elaboration, 2025)

Research question 1: Which areas of human resource management have been affected by automation and digitalization and the leveraging of new technologies? The aim of the research question (RQ1) is to find out which specific HR activities or processes (e.g. recruitment, adaptation, training, administration, communication, etc.) have experienced a change or transformation due to the introduction of modern technologies. The result of analysis can be seen in Table 2. Table 2 summarizes the results of a questionnaire survey that examined the extent to which different areas of human resource management in organizations have been affected by digitalization, automation, and other new technologies. The sample consisted of 177 respondents who rated the impact on a scale of: 0 (cannot say), 1 (no impact), 2 (minimal impact), 3 (medium impact), 4 (significant impact), 5 (very significant impact). The highest average impact was recorded in the areas of internal communication ($M = 3.36$; $SD = 1.459$) and administration ($M = 3.32$; $SD = 1.481$), indicating that technologies have significantly affected primarily operational and communication processes. Employee training and development ($M = 3.01$; $SD = 1.394$) and external communication ($M = 3.05$; $SD = 1.609$) also show a significant impact, with higher variance in external communication indicating greater diversity of experiences across organizations. Performance appraisal ($M = 2.66$; $SD = 1.515$) and workplace presence ($M = 2.82$; $SD = 1.599$) show a moderate impact of technology, likely related to the use of performance measurement systems and the range of remote work.

Lower impact was noted in areas such as career planning ($M = 2.18$; $SD = 1.485$), motivation ($M = 2.19$; $SD = 1.429$) and work-life balance ($M = 2.16$; $SD = 1.441$), with mean standard deviations indicating moderate variability in responses. The lowest mean values occurred in recruitment and selection ($M = 1.92$; $SD = 1.494$) and employee adaptation ($M = 1.95$; $SD = 1.538$), suggesting that these areas are less transformed by technology so far, and while some organizations may be using digital tools, many remain traditional in their approach. In general, the standard deviations range between 1.39 and 1.61, indicating moderate to higher variability in the responses, i.e. that the degree of technology impact varies between organizations – likely depending on their size, sector and level of digitalization.

Research question 2: In which areas of human resource management do respondents see the greatest scope for using automation and digitalization? The second research question (RQ2) aims to identify which HR areas respondents believe have the greatest potential for further implementation of digital and automated solutions. The specific results are presented in Table 3 below.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Simplifying the recruitment and selection process	177	0	5	2.58	1.562
Automation of administrative tasks (e.g. attendance)	177	0	5	3.68	1.387
More effective employee training and education through e-learning	177	0	5	3.72	1.317
Automated performance evaluation	177	0	5	3.02	1.524
Expansion and improvement of internal communication tools	177	0	5	3.07	1.495
Faster and more accurate career planning and talent management	177	0	5	2.45	1.515
Improving and simplifying processes related to remuneration and benefits	177	0	5	2.77	1.479
Personalizing work plans and schedules using digital tools	177	0	5	2.97	1.502
Optimization of payroll processing and administration processes	177	0	5	3.08	1.609
Improving the management and protection of employee data through digital solutions	177	0	5	3.03	1.593
Valid N (listwise)	177				

Table 3. Result of RQ2 analysis (own elaboration, 2025)

Table 3 captures the views of 177 respondents on where they see the greatest scope for the use of automation and digitalization in human resource management. The assessment was carried out on a scale: 0 (cannot say), 1 (no scope for use), 2 (small scope for use), 3 (medium scope for use), 4 (large scope for use), 5 (large scope for use). The highest average was recorded in more effective training and education through e-learning ($M = 3.72$; $SD = 1.317$), which indicates a strong consensus among respondents on the potential of digital platforms for employee development. The low standard deviation also indicates a relatively uniform perception of this area. The second highest value was obtained by automating administrative tasks such as attendance records ($M = 3.68$; $SD = 1.387$), which confirms that digitalization of routine activities is very attractive and feasible for organizations. Optimization of payroll management ($M = 3.08$; $SD = 1.609$), improvement of internal communication ($M = 3.07$; $SD = 1.495$) and improvement of management and protection of employee data ($M = 3.03$; $SD = 1.593$) also achieved average values above 3, which indicates a medium-sized scope for digitalization and at the same time considerable variability in responses – probably due to different levels of digitalization between organizations.

Automated performance evaluation ($M = 3.02$; $SD = 1.524$) and personalization of work plans and schedules ($M = 2.97$; $SD = 1.502$) are also perceived as areas with potential, although with a slightly higher dispersion of responses, which may reflect different experiences with the use of advanced digital tools in HR practice. Lower averages were recorded for compensation and benefits ($M = 2.77$; $SD = 1.479$), recruitment processes ($M = 2.58$; $SD = 1.562$), and lowest for career planning and talent management ($M = 2.45$; $SD = 1.515$). These areas may be perceived as more complex, less standardisable, or more demanding to implement technologies. Overall, the standard deviations range from 1.3 to 1.6, indicating moderate to high variability in respondents' opinions and indicating that many organizations are at different levels of readiness or digital maturity. The data confirms that respondents see the greatest digitalization potential in the HR sphere in the areas of education and administration, while more strategic or individually tailored processes are so far less digitalized.

Research question 3: How have been improved processes of human resource management if digitalization of these processes was implemented? The aim of the third research question (RQ3) is to evaluate the effectiveness and benefits of digitalization in specific areas of human resource management from the perspective of the respondents. The analysis of the given research question is presented graphically in the following Fig. 2.

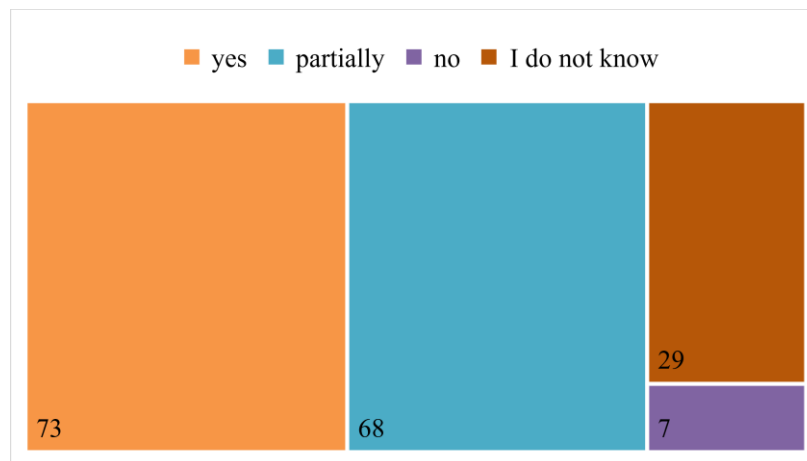


Fig. 2. Result of RQ3 analysis (own elaboration, 2025)

Based on the data in Fig. 2, it can be stated that 73 respondents (the largest share) answered “yes”, which means that they perceive digitalization as a clear benefit in terms of improving HR processes. Subsequently, 68 respondents chose the option “partially”, which indicates a perceived positive impact, but with certain reservations or only in some areas. A total of 29 respondents indicated that they “cannot answer”, which may indicate either a lack of information or the absence of direct contact with digitalized processes. Only 7 respondents answered “no”, which indicates that only a small percentage did not notice any improvement. Fig. 2 shows that the majority of respondents perceive digitalization positively, having completely or at least partially improved HR processes in organizations.

Integrating digital technologies into HR is essential to improve efficiency and compliance with standards and regulations [12]. Organizations must navigate the complexities of digital transformation, which is not just an IT project but a comprehensive business change initiative [13]. HR departments often face challenges related to the fear of job loss among employees, which can create resistance to the implementation of automation technologies [14]. High levels of technostress can hinder job satisfaction and are exacerbated by techno-uncertainty, which negatively impacts the perceived benefits of HR technologies [15]. Lack of management expertise and support can hinder the successful execution of HR automation initiatives, highlighting the need for leadership engagement [16] and [17]. Training opportunities and organizational support are essential to address the human aspects of integrating automation into HR [18].

4. Conclusion

Based on the survey, several key conclusions can be drawn. Digitalization and automation have most significantly affected the areas of administration and internal communication, i.e. mainly operational and routine HR processes. Respondents also identified the greatest potential for further use of technologies in the areas of education and e-learning, as well as in the automation of attendance and payroll management. More strategic areas, such as career planning, recruitment or motivation, are so far less affected by technologies. The results also indicate that the degree of digitalization varies between organizations depending on the size, industry and level of technological maturity. Most respondents perceive digitalization as a positive contribution to making HR processes more efficient, although some of them report only partial improvements. Overall, technologies already play an important role in HR today and at the same time there is wide scope for their further use, especially in areas with a higher degree of standardization.

The main limitations of the research include focusing only on medium and large industrial enterprises, which limits the possibility of generalizing the results to other types of organizations (e.g. small businesses or the public sector). Another limitation is the subjectivity of the respondents' answers, which may affect the objectivity of the findings. In addition, the research focused only on quantitative data, which lacks a deeper qualitative view of the reasons, obstacles or practical experiences with digitalization in HR. Future research could focus on analysing the factors influencing the rate of digitalization in different types of organizations, as well as exploring the potential of technologies in strategic HR areas such as recruitment, motivation, and career planning. It would also be beneficial to evaluate the effectiveness of specific digital tools in improving the performance of HR processes.

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