SILESIAN UNIVERSITY OF TECHNOLOGY PUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2025
ORGANIZATION AND MANAGEMENT SERIES NO. 217

ARTIFICAL INTELIGENCE IN HR PROCESSES

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Purpose: The purpose of the publication was to identify and assess the potential and actual state of artificial intelligence (AI) tools used in HR processes within large and medium-sized enterprises

Design/methodology/approach: The research problems were formulated as the following questions: 1) In which HR processes do enterprises utilize artificial intelligence? 2) What are the primary barriers associated with the use (or lack thereof) of artificial intelligence in HR processes within enterprises? The research employed a qualitative method—individual in-depth interviews (IDIs). The sample was purposefully selected and included employees, managers, and HR department directors. Data collection was conducted using a custom-designed interview guide.

Findings: The study revealed that AI is applied in processes such as recruitment, report generation, administrative task automation, and content creation. The benefits of AI implementation primarily include time savings and improved quality of analyses. However, a significant portion of respondents does not use AI due to barriers such as high implementation costs, lack of competencies, and concerns regarding data security. Employee resistance to change and automation also represents a significant challenge.

Research limitations/implications: The study covers large and medium-sized enterprises. Future research should involve quantitative analyses and examine industry- and sector-specific differences in AI implementation within HR processes.

Practical implications: The article can serve as a source of knowledge for managers and HR department staff, helping them identify processes where AI can deliver the greatest benefits. The research findings can support the planning of AI implementation strategies and the mitigation of technological and organizational barriers.

Social implications: The implementation of AI in HR processes can influence employees' quality of life by automating repetitive tasks, thereby allowing a focus on more valuable and creative activities. At the same time, concerns related to data privacy and the risk of job displacement due to automation should be considered.

Originality/value: The article presents original research on the application of artificial intelligence in HR processes. It addresses critical issues related to the benefits, barriers, and future directions for AI implementation in human resource management.

Keywords: artificial intelligence, human resource management, HR processes

Category of the paper: research paper.

1. Introduction

Artificial Intelligence (AI) forms the cornerstone of the Fourth Industrial Revolution, redefining how organizations operate within dynamic environments (Poisat et al., 2024). AI encompasses diverse technologies such as machine learning algorithms, natural language processing, and predictive analytics, which enable automation and optimization of decision-making processes (Grover, 2022). The rapid development of these technologies, including AI-driven tools, significantly transforms enterprise operations. These changes affect various organizational domains, including human resource management (HRM) (Tiwari et al., 2022).

AI in HR processes refers to the application of advanced computer technologies that mimic human intelligence to support, automate, and optimize various HR functions and tasks (Chandratreya, 2024). Initially, AI tools in HR were applied to basic operations such as payroll processing and benefits administration (Shivaraj, 2021). However, contemporary AI solutions are now implemented in more sophisticated processes, such as recruitment and candidate selection, onboarding, training, and development (Figure 1). Enterprises increasingly adopt AI solutions in systems like Applicant Tracking Systems (ATS) and chatbots that support employees, analyze their sentiment, or measure engagement levels. The literature indicates that AI accelerates candidate assessment and matching during recruitment processes (Shettigar, 2024). AI also enhances feedback delivery and streamlines HR reporting and analytics.

An analysis of publications available in the Scopus database identified 36 papers with the keyword phrase "AI in HR processes." The majority of these studies were published in 2024, a period marked by significant growth in interest surrounding AI. Based on a keyword linkage analysis (Figure 1), six key research areas were identified:

- area 1 (red) – Employee Development and Organizational Support; This area links the application of artificial intelligence with processes that support employees and shape their engagement;
- area 2 (purple) – AI in Recruitment and Talent Acquisition; This area connects artificial intelligence with recruitment, employee selection processes, and talent management;
- area 3 (blue) – Future of Work and AI Integration in HR; This area focuses on the future of work and the application of AI in human capital management within a strategic context. It emphasizes machine learning technologies used in HR processes;
- area 4 (orange) - Foundational AI in HR Processes; This area covers general issues related to the fundamental applications of AI in HR processes;
- area 5 (yellow) - Human Resource Management and Personal Growth; This area addresses human resource management in conjunction with employees' personal development;
- area 6 (brown) - AI Adoption in Core HR Functions; This area focuses on adopting artificial intelligence in core HR functions, such as natural language processing and

strategic process management. It also discusses the intent behind AI implementation within organizations.

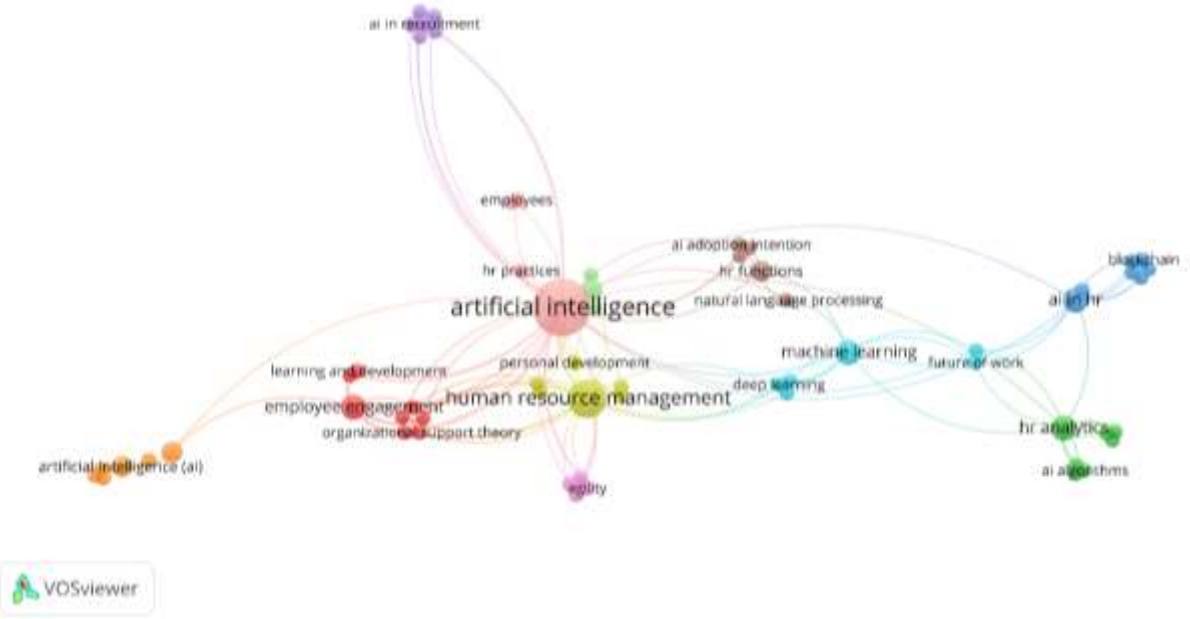

Figure 1. Keyword Linkage Map Based on the Search Query "AI in HR Processes.
Source: own study.

The keyword linkage analysis demonstrated that the topic addressed in this publication aligns with all the identified clusters. The limited number of publications focusing on the application of artificial intelligence in HR processes creates an opportunity to further explore this subject. Identifying research areas (clusters) that reflect various aspects of AI's impact on HR processes constitutes the first step in pinpointing research gaps.

As highlighted by Jia et al. (2022), there is a lack of specific empirical studies examining the long-term effects of AI-based technologies on employee satisfaction and motivation. On the other hand, the literature presents studies that emphasize the significant potential of AI in optimizing HR processes (Marel, Boudreau, 2017) or its use in recruitment and employee selection processes (Tambe, 2019). Jatoba et al. (2021) point out the absence of research comparing the practical outcomes of AI implementation in HR processes. Similarly, Huang et al. (2020) underscore a gap in understanding the barriers to AI adoption in HR processes. In light of the identified research areas, several gaps emerge that warrant further exploration. There is a clear need for studies that investigate the applications of AI in HR processes. The aim of this publication was to identify and assess the current state of AI tool applications in HR processes within large and medium-sized enterprises.

The research presented in this publication, unlike previous studies that often focus on the theoretical potential of AI or rely on quantitative analyses, is based on a qualitative methodology. This methodological approach allowed for an in-depth understanding of the context and specificities of AI implementation in medium and large enterprises. The study contributes to the field by identifying both the benefits and barriers associated with the use of AI in HR

processes. Furthermore, it highlights the key areas where AI is actually being applied in practice.

2. The use of Artifical Intelligence in HR processes

HR processes encompass an organized set of activities related to workforce planning, recruitment, development, evaluation, and employee retention. Their primary goal is not only to ensure and secure the organization's human capital but also to manage it effectively. Modern HR processes are evolving toward a strategic approach, in which the HR function often becomes a business partner supporting organizational goals (Ulrich, 2016; Wandhe, 2020). The widespread use of modern information systems enhances HR process efficiency, allowing for the automation of administrative tasks and a focus on higher-priority activities (Wandhe, 2020). The fundamental HR processes include (Pieniacka, Tochwin, 2024; Konecki et al., 2018; Boxall, Purcell, 2016):

- workforce planning,
- recruitment and employee selection,
- onboarding,
- development and training,
- compensation and benefits management,
- offboarding.

Each of these processes plays a significant role in human capital management and influences organizational efficiency (Stoisk, Leśniewska, 2015). The effectiveness of HR processes increases with the integration of technology, including AI, which enables more precise decision-making and better alignment of actions with employee needs (Qin et al., 2023; Choudhary, Pandita, 2024). Artificial intelligence is transforming HR functions, shifting them from administrative to strategic, particularly in the area of process automation. AI is playing an increasingly important role in human capital management, especially in recruitment processes (Shettigar, 2024; Strang, 2022). AI-based tools facilitate the rapid analysis of candidate data, significantly shortening the selection process and enhancing its efficiency (Li et al., 2021). AI systems can evaluate candidate competencies through hierarchical analysis and machine learning algorithms, reducing the time required for application reviews and minimizing human errors (Strang, 2022; Zhai et al., 2023). Additionally, the use of AI in recruitment allows for the evaluation of candidates for organizational culture fit (Jia, Hou, 2024).

Another HR process supported by AI is employee training and development. By analyzing individual employee needs, AI recommends appropriate training programs, enhancing the effectiveness of skill development (Zhai et al., 2023). AI can also analyze historical data, making

the personalization of employee development paths even more precise (Hou, 2024). The implementation of AI-based solutions in employee training and development processes supports sustainable development strategies and provides recommendations to managers (Jia, Hou, 2024). This, in turn, can influence engagement management and foster employee loyalty (Prasad, De, 2024).

In compensation management processes, artificial intelligence can assist in optimizing e-compensation processes by providing accurate and precise analyses of compensation and benefits structures (Louali. El Abboubi, 2023). This automation also facilitates salary market analysis and adjusts compensation levels to reflect changes in the labor market, enhancing the efficiency of compensation management.

The use of artificial intelligence in HR processes brings both advantages and challenges. Key benefits include the automation of routine tasks, the reduction of cognitive biases, increased fairness in recruitment and employee evaluation processes, and enhanced personalization of training (Strang, 2022; Jia, Hou, 2024; Zhai et al., 2023). On the other hand, several challenges arise with the implementation of AI in HR processes. These challenges include ethical issues related to data privacy, high implementation costs, employee resistance, fear of job loss, inadequate technical infrastructure, and low adoption rates of new technologies (Louali, El Abboubi, 2023; Strang, 2023; Zhai et al., 2023).

3. Methodology

The primary objective of the conducted research was to identify the current state and potential of artificial intelligence application in HR processes. The research problems were formulated as the following questions: 1) In which HR processes do enterprises use artificial intelligence? 2) What are the main barriers to the use (or lack of use) of artificial intelligence in HR processes within enterprises? The research described in this publication employed qualitative methods. Due to the specific nature of the study, a reconstructive method was applied (Mazurek-Łopacińska, Sobocińska, 2018). To collect research material, individual in-depth interviews (IDI) were conducted. As a rule, the number of interviews in a study of this nature should range between 20 and 30, providing a solid basis for analyzing data and drawing conclusions (Olejnik, Kaczmarek, 2018). The interviews were conducted between August and September 2024. The sampling method was purposeful. The respondents included individuals holding positions in HR departments/personnel or payroll departments, HR directors/managers, business owners, or other decision-makers. This selection was dictated by the need to gather detailed and up-to-date information on the analyzed topic. The research was conducted in large and medium-sized enterprises within the private sector. A custom-designed interview guide was developed.

This tool was divided into three research areas:

a) Introductory questions – identifying the use of AI tools in HR processes within the enterprise or the reasons for not using AI in HR processes.
b) Research area 1 – the use of artificial intelligence in HR processes in large and medium-sized enterprises.
c) Research area 2 – barriers to and the future of AI implementation in HR processes in large and medium-sized enterprises.

The identified research areas correspond to the following categories outlined in the keyword linkage analysis (see Figure 1): foundational AI in HR processes and future of work and AI integration in HR. The interview guide included questions regarding the reasons for using or not using AI tools in HR processes and the potential plans for their implementation in the future (considering specific processes they may apply to). Respondents were also asked to identify the benefits of implementing AI solutions in HR processes and their impact on employee experiences, responsibilities, and competencies. Additionally, participants were requested to indicate future trends in the use of AI in HR processes and the key competencies that HR department employees will need in light of the increasing adoption of artificial intelligence.

To analyze the collected empirical material, narrative analysis and qualitative data analysis were conducted using the MaxQDA software. The collected data were transcribed and then subjected to a coding procedure. A total of 115 segments were coded into 9 codes (Table 1).

Table 1.
The coding system used in the qualitative research

Coding system	Fequency
Coding system	115
AI tools in HR processes	18
Benefits of AI implementation in HR processes	16
Barriers to implementing AI tools in HR processes	9
Impact of AI implementation on the employee experience	9
Impact of AI implementation on changes in employee responsibilities	9
Impact of AI implementation on changes in HR employee competencies	9
Reasons for not using AI tools	9
Planning the implementation of AI tools in HR processes	18
AI tools in HR processes	18

Source: Own study based on MaxQDA.

Among the respondents, the largest group consisted of HR department employees (36.8%), followed by HR managers and heads of these departments (31.7%). Just under 16% of respondents held the position of HR Business Partner. The remaining respondents held positions such as board member, company owner/CEO or manager. Most of the surveyed enterprises operate in the manufacturing industry (10 enterprises), while the others belong to industries such as IT, media, banking, e-commerce, and education.

4. Results and discussion

The described study revealed various aspects of implementing artificial intelligence in HR processes. The majority of respondents (56%) stated that they currently do not use AI tools in HR processes. These tools are applied in multiple areas of HR activities (Table 2). HR employees and managers use AI to prepare job advertisements, which accelerates the candidate acquisition process. Additionally, managers utilize AI to improve administrative tasks and generate reports. HR Business Partners (HRBPs) apply automation for generating content, graphics, presentations, and meeting notes. Among HR department heads surveyed, the most common AI applications are related to reporting and candidate selection.

Table 2.
AI Tools Used in HR Processes by Respondent Job Roles

	HR Department Employee	**HR Department Manager**	**HR Business Partner (HRBP)**	**HR Department Head**
AI Tools Used in HR Processes	**Recruitment** HR Department Employee > Large enterprises: 2 - 2 **Recruitment** HR Department Employee > Large enterprises: 2 - 2	**Recruitment** HR Department Manager> Large enterprises: 2 - 2 **Administrative support** HR Department Manager> Large enterprises: 2 - 2	**Reports** HRBP > Large enterprises: 2 - 2 **Various automations** (robots) HRBP > Large enterprises: 2 - 2 **Content generation** HRBP > Large enterprises: 2 - 2 **Graphic generation** HRBP > Large enterprises: 2 - 2 **Presentation generation** HRBP > Large enterprises: 2 - 2 **Tools for summarizing (meeting notes)** HRBP > Large enterprises: 2 - 2	**Report writing** HR Department Head > Large enterprises: 2 - 2 **Recruitment** HR Department Head > Large enterprises: 2 – 2 **Selection and recruitment** HR Department Head > Large enterprises: 2 - 2

Source: own study based on MaxQDA.

The implementation of AI brings numerous benefits. One of the most frequently mentioned advantages is time savings. Thanks to AI, the processes of application selection and reporting are significantly shortened, as noted by both HR employees and managers. Automating simple tasks reduces time burdens and allows staff to focus on more complex activities. AI tools also foster the generation of new ideas and improve communication with candidates. HR Business Partners (HRBPs) emphasized that automation increases the efficiency of actions, which translates into higher work quality. As one respondent stated, a benefit of using AI in HR processes is that "there is no need to import data manually; you only need to verify it, which takes minimal time, so we achieve significant time savings on simple tasks."

Despite the numerous benefits, AI implementation also involves certain barriers (Figure 2). Lack of experience in working with artificial intelligence and the high costs of implementation and maintenance are significant obstacles. Additionally, AI models require continuous training and do not always operate with precision, which limits user trust in automation. There are also concerns related to data security and a low level of awareness regarding the potential of AI solutions. Furthermore, organizations often experience resistance to change and a preference for working with people rather than computers.

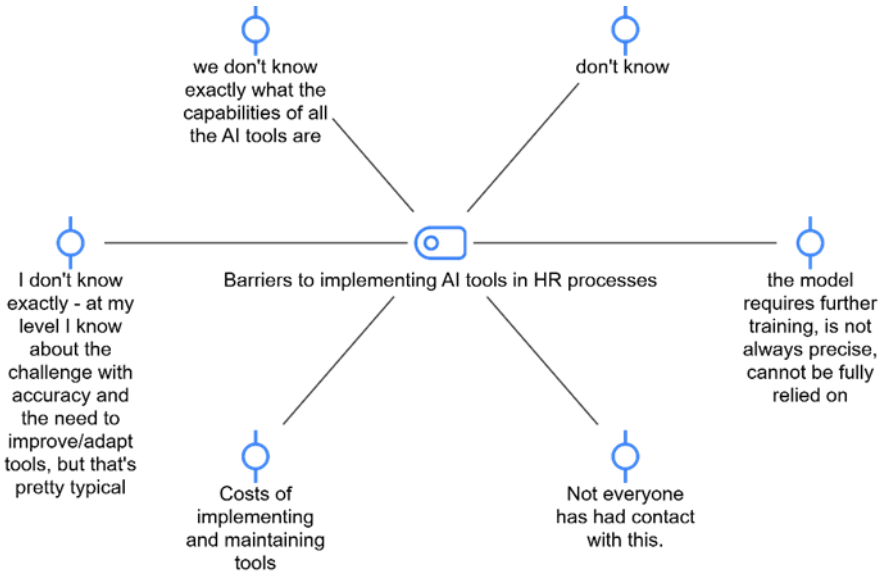

Figure 2. Single code "Barriers to implementing AI tools in HR processes" model (coded fragments)
Source: own study based on MaxQDA.

Respondents were asked to indicate how the implementation of AI solutions in HR processes affects the employee experience. Their assessment was described as varied. Among the benefits, they mentioned improved work comfort and enhancements to recruitment processes. HR employees noted that AI tools can accelerate processes; however, in some cases, automation may lead to rigid procedures and reduced flexibility in analyses. As one respondent explained: "It always improves and speeds things up, makes things a bit easier, but it also makes them a bit rigid — we get data presented in a specific way, we observe specific parameters. This has somewhat reduced the need for additional analyses and obscured other parameters. A significant positive is the ability to have data served on a platter. Some tasks provoke fear. For example, fear of job loss with the advancement of AI because some support roles might disappear completely."At the same time, respondents expressed concerns about job losses stemming from the automation of simple support tasks. Despite this, employees show a positive attitude toward changes associated with the implementation of artificial intelligence in HR processes.

The implementation of new technologies involves introducing changes within organizations. The study addressed the issue of changes in HR employees' responsibilities and competencies resulting from the adoption of AI solutions. According to the conducted research, these

changes are noticeable, though not always clear-cut. AI tools, to some extent, reduce the need to engage additional personnel for performing simple tasks, which saves time for roles such as recruiters. The automation of HR processes also reduces human errors, making reporting and data analysis processes less prone to mistakes. However, respondents indicated that the implementation of AI in HR processes requires the acquisition of new skills, such as prompt writing, the operation of automation tools, and the enhancement of employees' digital competencies.

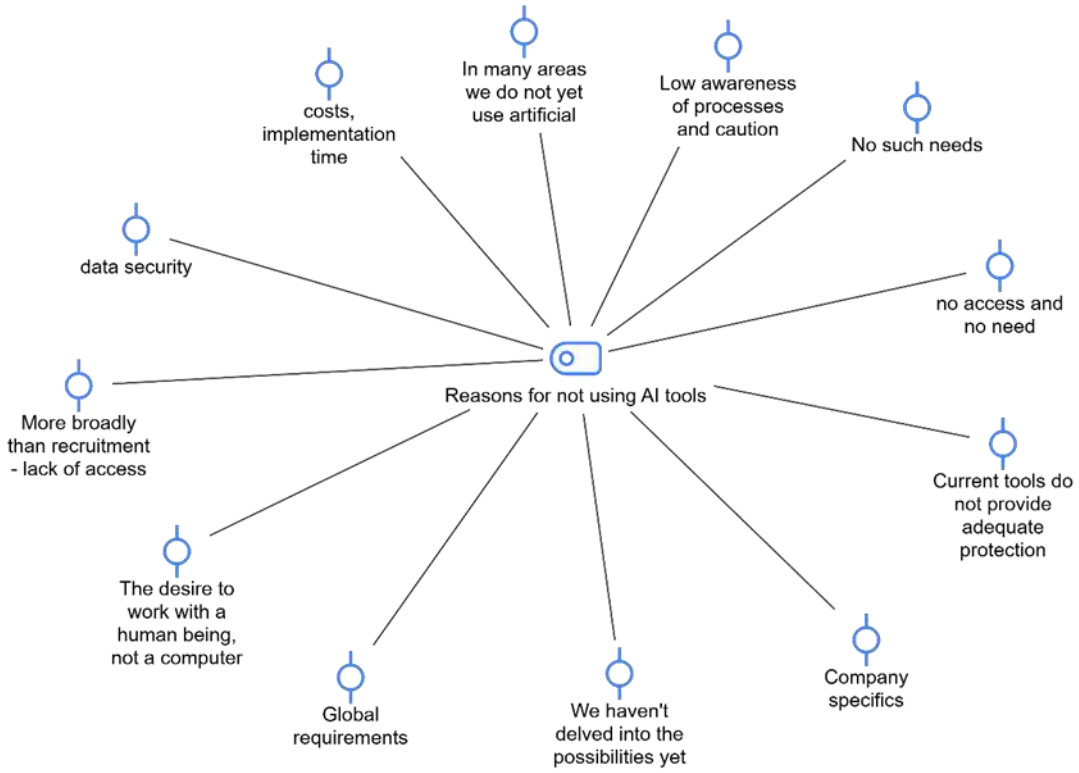

Figure 3. Single code "reasons for not using AI" model (coded fragments).

Source: own study based on MaxQDA.

In the group of respondents who indicated that AI tools are not used in HR processes at their workplace, the reasons for this phenomenon were identified (Figure 3). These reasons include no need for AI beyond recruitment, the specific nature of the organization, implementation costs, and concerns about data security. In many cases, respondents noted that employees do not have access to the appropriate tools or lack the skills necessary to use them. Some mentioned that organizations prefer human-to-human communication rather than human-to-computer interactions. Respondents were also asked about plans to implement AI in HR processes in the future. While some expressed a willingness to adopt AI, they noted a lack of concrete plans and actions. HR managers and department heads expressed interest in introducing AI, but these decisions are often postponed due to technological, financial, or organizational barriers.

The conducted research revealed that artificial intelligence (AI) is most frequently utilized in recruitment processes, automation of administrative tasks, and report generation. Similar findings were reported by Shettigar (2024) and Li et al. (2021), who highlighted that AI accelerates candidate selection processes, improves job matching accuracy, and eliminates human

errors. However, in this study, only 44% of respondents declared the use of AI tools in HR processes, which indicates their limited implementation in medium and large enterprises. In the literature, such as the research by Jatobá et al. (2021), AI is also shown to be employed in more advanced areas, including the personalization of career development paths and employee engagement analysis. These applications were not observed in the present study, which suggests that technological and competency-related limitations in the surveyed organizations may pose significant obstacles to fully leveraging AI's potential. These findings underscore the need for greater support for organizations in implementing AI not only in operational but also strategic HR processes.

Another significant finding of the study concerns the barriers to AI adoption. Respondents identified high implementation costs, lack of technical competencies, and concerns about data security as the primary challenges. These results align with the findings of Huang et al. (2020), who emphasized organizational barriers such as distrust of AI algorithms and ethical controversies related to biases embedded in AI models. Additionally, the current study highlighted employees' resistance to technological changes. Similar observations were made by Louali and El Abboubi (2023), who pointed out that fear of job loss is one of the key factors hindering the adoption of new technologies. In contrast, Marler and Boudreau (2017) noted that organizations successfully implementing AI often invest in employee training and skill-building, which facilitates the acceptance of such tools in daily operations. The results of the present study suggest that implementing AI requires a holistic approach that considers not only technological but also psychological and organizational factors.

Finally, the study found that AI application in HR processes offers numerous benefits, such as time savings, error reduction, and improved analysis quality. Zhai et al. (2023) emphasized that AI tools streamline process management, particularly in recruitment and HR data analysis. However, as noted by Jia and Hou (2024), there remains a lack of research on the long-term effects of AI on employee satisfaction and engagement. The findings of this study confirm that, in the short term, AI implementation improves work comfort and process efficiency but may also lead to procedural rigidity and concerns about losing control over key decisions. Future research should focus on the long-term impact of AI on organizational culture, the relationship between employees and technology, and strategies to support the adaptation of these tools in an evolving work environment.

5. Summary

In an era of widespread digitization and continuous technological development, the comprehensive yet gradual introduction of AI-based solutions into organizations is inevitable. Implementing AI, especially in HR processes, presents both challenges and risks. One of

the key issues is the risk of algorithmic bias. This risk can arise from reinforcing existing stereotypes if AI models are trained on inappropriate data (Prasad, De, 2024). Another challenge is the issue of data privacy. AI systems collect and analyze vast amounts of information, which can lead to violations of employee privacy (Strang, 2022). Furthermore, a critical challenge is resistance to change and the fear of humans being replaced by machines (Louali, El Abboubi, 2023). Despite these challenges, AI has the potential to significantly improve the efficiency of HR processes within organizations. However, attention must be given to ethical considerations and minimizing associated risks (Tinguley et al., 2023).

The research showed that although artificial intelligence has significant potential to improve HR processes, its use is currently limited to specific areas such as recruitment, report generation, and the automation of simple administrative tasks. A substantial portion of respondents (56%) do not use AI tools in HR processes, primarily due to cost barriers, lack of skills, and resistance to change. At the same time, those who use AI recognize benefits such as time savings, improved data quality, and enhanced communication with candidates. the results partially confirmed the hypothesis.

The results of the study provide clear answers to the research problems formulated in the introduction. The first research problem, which aimed to identify the HR processes in which enterprises use AI, revealed that AI is primarily applied in recruitment, administrative task automation, and report generation. However, more advanced applications, such as employee engagement analysis or personalized training paths, remain underutilized. In response to the second research problem, which focused on identifying barriers to AI implementation, the study highlighted significant challenges, including high costs, lack of technical skills, and concerns about data security. Additionally, organizational resistance to change and employees' fear of job displacement were identified as critical obstacles. These findings demonstrate that while AI offers substantial potential benefits, its adoption is hindered by both technological and human-related barriers, necessitating targeted strategies to address these issues.

The research also underscores the need for enterprises to develop competencies and infrastructure to overcome these barriers and better utilize AI's capabilities. These insights provide a valuable basis for further exploration of AI adoption in HR and for formulating practical recommendations for organizations. The author acknowledges the limitations of the described study. Primarily, the research included only large and medium-sized enterprises and a limited number of respondents from HR departments. The purposeful sampling method used may affect the generalizability of the findings to other industries and sectors. Additionally, the study focused on qualitative analysis methods, which limit the ability to precisely determine the scale of the phenomenon on a quantitative level. Another limitation is the lack of analysis of the long-term effects of AI implementation on employee engagement and satisfaction.

Future research directions should include expanding the research sample to encompass various industries and sectors to obtain a more representative picture of AI use in HR. It would also be valuable to conduct quantitative research to determine the scale of the phenomenon and

its impact on organizational efficiency. Another important area could be the analysis of the long-term effects of AI implementation in HR processes, with a particular focus on employee satisfaction, engagement, and motivation. Research should also focus on identifying best practices for AI implementation and strategies for minimizing barriers related to costs and resistance to change.

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