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CHAPTER 2

Artificial Intelligence Adoption in Human Resources Management

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Abstract: In recent years, dynamic changes have been observed in organizations stemming from usage of novel technologies. Among others, artificial intelligence application to Human Resources Management is a developing field of study which shows constant growth. The aim of this paper is to recognize the state of AI adoption in HR departments with a special concern on advantages and disadvantages, attitudes and state of knowledge of HR professionals basing on the results of the literature review as well as empirical research. A systematic review of world literature was carried out using the following databases: Proquest, EBSCO, Emerald, JSTOR, Science Direct and BAZEKON. The results were supplemented with conclusions from quantitative research conducted on the sample of 50 HR professionals. The most visible application of AI can be observed in recruitment and selection although other HR processes may also benefit from it. AI can improve the work of HR departments. The most often mentioned advantage was a possibility to automate routine tasks, while the lack of empathy and "human" approach prevailed among disadvantages. Few companies have implemented or plan to implement AI in HRM in the near future which is confirmed by other studies stating that the application of AI has not advanced as expected.

Keywords: artificial intelligence, HR department, HR professionals, HR processes

2.1. Introduction

In recent years, dynamic changes have been observed in organisations based on technologies of the Internet of Things, Big Data, blockchain, artificial intelligence (AI), Industry 4.0 (Urba et al., 2022). The changes concern also HR departments as AI has enormous implications for human skills in organizations (Poba-Nzaou et al., 2021). In fact, a new concept is also evolving as part of 4th Industrial Revolution called Smart Human Resources 4.0 (SHR 4.0) which concerns using innovations, e.g., artificial intelligence, Internet of Things or Big Data Analytics for the effective management of new generations of employees (Sivathanu & Pillai,

2018). In particular, artificial intelligence application to Human Resources Management is a developing field of study which shows constant growth (Palos-Sánchez et al., 2022). AI may support three areas of business functioning, namely: enhance business process automation, provide cognitive insights that facilitate decision-making and support cognitive engagement through intelligent agents and chatbots (Johnson et al., 2020).

The novelty of the topic, as well as the ever-developing possibilities of improvement, cause the existence of research gaps regarding the implementation of artificial intelligence to the HRM process. Thus, the aim of this paper is to recognize the state of AI adoption in HR departments with a special concern on advantages and disadvantages, attitudes and state of knowledge of HR professionals basing on the results of the literature review as well as empirical research. The following research questions were formulated.

1. What are the attitudes and state of knowledge of HR professionals in the field of artificial intelligence?
2. What are the advantages and disadvantages of the use of artificial intelligence in HR departments stated by HR professionals?
3. What is the current state of AI implementation in HRM and what are the plans for the future?

2.2. Literature Review

Artificial intelligence was at first defined by McCarthy in 1956 as "the science and engineering of making intelligent machines" (Mukherjee, 2022). It is a system created by a human being that can think and behave rationally, in a manner similar to a human. This technology is still developing and has many applications in the economy. In the management of organizations, and in particular in human resources management, it is also possible to obtain benefits from the use of artificial intelligence. Already in 1994 introduction of expert systems was observed, followed by fuzzy logic in 2000, artificial neural network in 2001, then data mining in 2006, genetic algorithm in 2008 and machine learning 2011 (Qamar et al., 2021). Likewise, sensory and tracking technologies as well as metabolism monitors have been introduced as AI-based decision making technologies (Arslan et al., 2022).

The implementation of AI may take a number of different forms: robotics automation, machine learning, natural language processing, recommendation engines, using robots to address common staff queries, manage vast and diverse datasets, support decision--making and make predictions for the future (Sakka et al., 2022; Votto et al., 2021). This is usually done for tasks that are routine, repetitive, while people are better suited to tasks that require creativity, judgment, or flexibility (Kambur et al., 2022; Tian et al., 2022). There are three main components which differ AI from conventional software: high-speed computing, large quantities of high-quality data and advanced algorithms (Vorzhakova & Boiarynova, 2020).

Nowadays, the most visible application of artificial intelligence can be observed in recruitment and selection processes (Palos-Sánchez et al., 2022). It is pointed out that AI can be used in three steps of the recruitment process, namely: sourcing, screening of resumes and candidate matching (Garg et al., 2021; Tian et al., 2022). Chatbots (virtual assistants) are able to provide 24/7 support and communication with candidates, responding with a positive or rejection message within 24 h from receiving the application (Kambur et al., 2022) and a sharp increase is observable in interest in social chatbots in recent times (Kusý & Varečková, 2021). AI may not only use psychometric tools, or integrate multiple data, but also synchronize behavioral competency of candidates, analyse their rate of success, and study the rate of attrition of the organization (Mukherjee, 2022). Androgynous robots may be effectively used for interviewing candidates: to provide information on the interview, to ask competence-related questions and to record and transcribe candidates' responses (Trocin et al., 2021). Unbiased, objective machine learning software may detect facial expressions of candidates to evaluate their motivation levels (Kappen & Naber, 2021). Subjective criteria such as nepotism and favouritism are less likely to be observed and the whole process of recruitment is more effective (Bailao et al., 2022; Kshetri, 2021).

As for other HR processes AI may be used in:

- onboarding through identifying individual needs tailored to specific role,
- employee development for tailored trainings delivered just in time,
- performance management for preparation of a holistic picture of performance evaluated in comparison to other employees,
- compensations through automatic tracking across many data sources (Johnson et al., 2022) or to design salary forecast algorithms (Gong et al., 2022);
- engaging employees through intellectual surveys, real-time feedback platforms, awards and recognition, personalized messaging and communication (Vorzhakova & Boiarynova, 2020);
- talent management processes, decisions require access to and analysis of a lot of data about the current needs of talents we want to keep in the organization (Claus, 2019);
- machine learning techniques are also used for employee attrition – to understand what are the key indicators and probability of employee leaving the company (Fallucchi et al., 2020).

Research confirm that adoption of artificial intelligence may also significantly influence the employer reputation (Kot et al., 2021).

Nevertheless, the use of artificial intelligence raises many doubts and challenges. There are concerns among employees whether they would be replaced by artificial intelligence and questions about further development of their career (Kong et al., 2021). Fear and distrust concern also perceived limitations in the accuracy and reliability of AI decisions (Ore & Sposato, 2021). What is more, algorithm-based HR decision-making may evoke blind trust in the process which can marginalize human sense-making or moral imagination (Leicht--Deobald et al., 2019). Humans may also be harsher for others, following an algorithm which

suggests more strict disciplinary actions (Bartosiak & Modlinski, 2022). Ethical issues are also raised, namely designing and developing ethical HRM systems to eliminate AI design bias (Rodgers et al., 2023). Moreover, due to the protection of personal data, an organization may not know that AI discriminates against candidates (Van Bekkum & Zuiderveen Borgesius, 2023), algorithms can also produce discriminatory results, even when seem to be neutral (Gay & Kagan, 2018). It is also raised that there is a tension between extensive use of Big Data and AI and the demand to use data ethically and socially responsibly (Mantelero, 2018).

The process of AI implementation may be affected by no clear vision and limited understanding as well as shortage of employee data and managers' attitudes to bypass AI decisions (Tuffaha et al., 2022). Complexity of HR phenomena, data challenges from HR operations and employee reactions to AI management result in slow progress in AI adaptation (Tambe et al., 2019). Last, but not least, development of AI requires transformation of HRM processes and training of the personnel (Tian et al., 2022; Urba et al., 2022) as well as qualified personnel to serve and maintain AI (Vorzhakova & Boiarynova, 2020).

2.3. Methods

For the purpose of this paper two types of research have been conducted: review of the literature and empirical quantitative analysis with the use of own questionnaire.

The first stage of research involved a systematic review of world literature in the subject of artificial intelligence usage in HR processes. In the first phase, the purpose of the research was defined, namely to obtain knowledge on the state of and ways of AI usage in HR processes. The scope of literature was selected using a review of the following databases: Proquest, EBSCO, Emerald, JSTOR, Science Direct and BAZEKON. It was decided to choose the databases to which the author had access at least in part full-text. Then, the selection of publications was made by searching for the following keywords in abstracts: "artificial intelligence", "Human Resources", "HR department" in a group of scientific articles published since 2018 in Polish and English. It was decided to narrow down to the last five years to obtain the latest research results, showing the impact of technological changes in HR departments. In this phase of the study, the research was restricted to 168 articles.

Search results were developed by checking possible repetitions of articles or non--scientific articles and verification of the content of abstracts. As many as 11 articles were removed at this stage. The next phase involved an analysis of the full content of the articles and on this ground it was decided to remove further 116 articles with content inadequate to the area of research. It should be mentioned that search engines pointed to articles with very little concern for artificial intelligence, e.g., the word was only mentioned among other technology-related novelties. As a result, 41 papers were obtained. The selection of publications was carried out in January 2023. In the next phase, a content analysis was carried out. Subsequently, the conclusions of the research were developed.

Table 2.1. Research methodology

Stage number	Description					
Stage 1	Defining the purpose of the research					
Stage 2	Selection of databases: PROQUEST, EBSCO, EMERALD and BAZEKON					
Stage 3	Selection of articles with criteria as follows: a scientific article, published since 2018 in English or Polish. Keywords: artificial intelligence, Human Resources, HR department					
Stage 4	Selection of 168 articles:					
	Proquest 16 art.	Bazekon 1 art.	EBSCO 17 art.	Emerald 49 art.	JSTOR 16 art.	Science Direct 69 art.
Stage 5	Removal of 127 articles (including 6 repetitive, 116 inadequate, 5 unscientific)					
Stage 6	Analysis of the remaining 41 articles' content					
Stage 7	Conclusions, summary of research					

Source: own study.

The second step of the research involved quantitative analysis with the use of own questionnaire conducted by the author in January-February 2023 on the sample of 50 HR professionals. The research sample was deliberately selected through direct contacts using social networks LinkedIn and Facebook. The profile of a potential respondent and belonging to thematic groups related to the HR industry were analysed, and then a message inviting to participate in the study was sent.

The respondents were mostly HR senior specialists (30%) or HR managers (30%). Half of respondents had up to 5 years of experience in HR industry, 24% had from 6 to 10 years of experience and 22% even over 16 years of experience. They represented organizations from many sectors with a predominance of IT (28%) and services (20%). These were mainly very large organizations, employing more than 500 people (50% of the sample), with 16% employing from 250 to 499 people, and 20% from 50 to 249 people. Details of the research sample have been presented in Table 2.2.

Table 2.2. Details on research sample

Representatives' profile	
Position in the structure	director/manager of HR department – 30% HR senior specialist – 30% HR junior specialist – 14% HR intern – 4% other – 22%
Experience in a HR industry	1–5 years of experience – 50% 6–10 years of experience – 24% 11–15 years of experience – 4% over 16 years of experience – 22%

Organisations' profile	
Industry	banking – 4% construction – 2% finance and insurance – 4% industry – 10% pharmaceuticals and health care – 4% public administration – 2% sales – 10% services – 20% IT sector – 28% other – 16%
Employment	up to 10 employees – 8% 10–49 employees – 6% 50–249 employees – 20% 250–499 employees – 16% over 500 employees – 50%

Source: own study.

2.4. Results of Empirical Research

Knowledge and Attitudes towards Artificial Intelligence among HR Professionals

In the first part of the study the attitude of HR professionals to the implementation of artificial intelligence in HR departments was analysed. Four statements were presented to respondents with a request to determine the extent to which they agreed or disagreed with each statement. They have been analysed below.

Artificial intelligence can improve the work of HR departments. The vast majority of respondents say that AI can improve the work of HR departments (strongly agree – 54%, rather agree – 30%). Only 6% rather disagree with the sentence and 10% hesitate.

Artificial intelligence is a threat to occupational safety in HR departments. Almost half of the respondents have no concerns about occupational safety risks in HR departments although the answers were less decisive (8% strongly disagree with the safety threat, 38% rather disagree). At the same time, as many as 28% of respondents notice such threats (rather agree – 22%, strongly agree – 6%), and 26% are not sure whether such threats exist.

I am a supporter of the implementation of artificial intelligence to work in HR. The research shows that more than half of respondents define themselves as supporters of the implementation of AI in personnel processes (24% strongly agree, 36% rather agree). 28% of respondents is not sure whether they support such implementation and only 12% said they rather disagree.

I have too little knowledge about artificial intelligence in HR work. Similar number of respondents admit that they have too little knowledge about AI at HR (strongly agree – 22%,

rather agree – 32%). At the same time 26% say that they have enough AI knowledge and 20% hesitates.

The use of artificial intelligence in HR work, according to respondents, mainly means the use of chatbots and virtual assistants (84%) and data management analytics (78%). Process automation (76%) and smart search engines (70%) are also treated as part of artificial intelligence for HR professionals. Algorithms, HR data management systems and AR for trainings gained less indications (Figure 2.1).

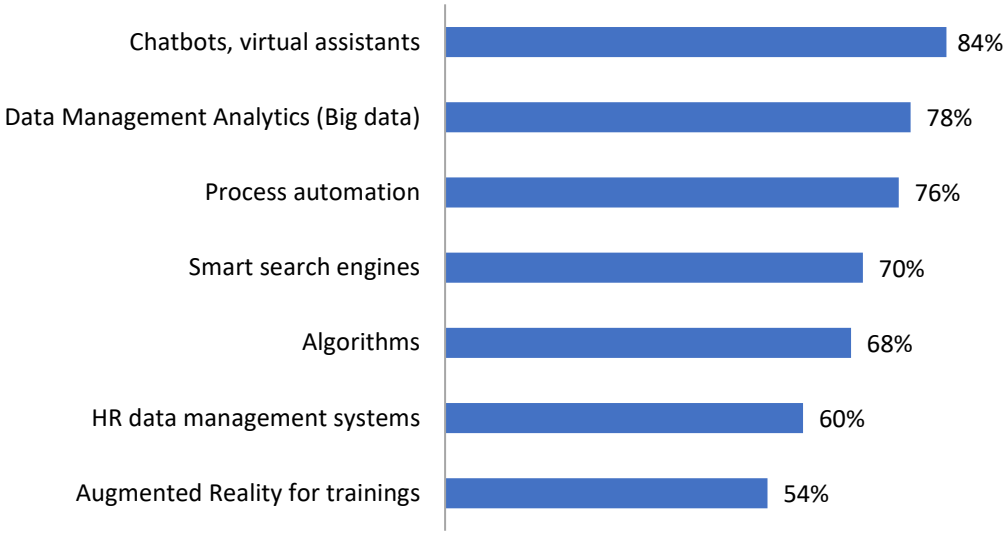

Figure 2.1. The use of Artificial Intelligence in HR departments' work

Source: own study.

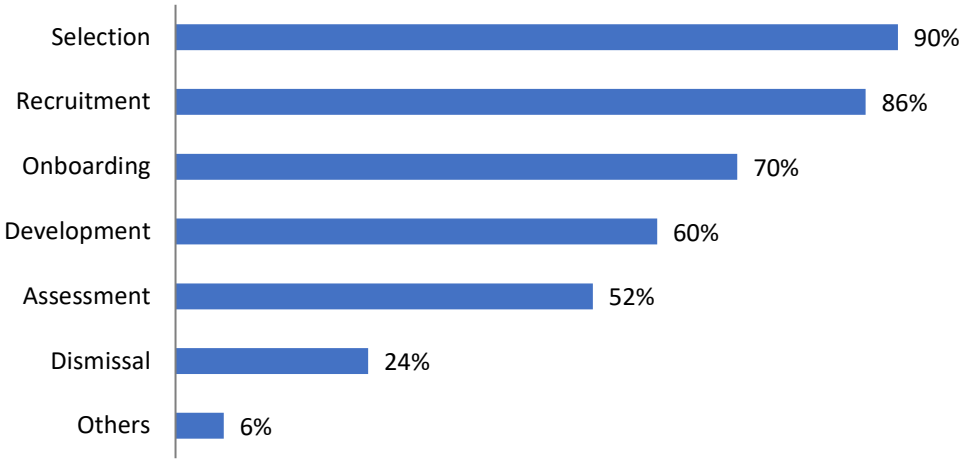

Figure 2.2. HR processes in which AI can be used

Source: own study.

Respondents see the possibility of using artificial intelligence mainly in the recruitment process (86%) and selection (90%) of employees. This may be related to the previous answer regarding chatbots and virtual assistants, used to a large extent in processes related to communication with job candidates. More than half of the respondents also see the possibility of using AI in the onboarding of new employees (70%) and their development (60%). It seems less desirable for respondents to use AI to evaluate employees, although 52% still consider it possible. AI is definitely inadequate for dismissal of employees (only 24%) (Figure 2.2).

Advantages and Disadvantages of the Use of Artificial Intelligence in HR Departments

HR professionals mention many advantages associated with possible implementation of artificial intelligence in the workplace. The main one is the possibility to automate routine tasks, mentioned by almost all respondents (94%). This can be, for example, working on the same documents many times, answering the same questions, filling in the same tables, etc. Another advantage is the AI ability to analyse big data (90%). Management of employee data related to recruitment, career tracking, development, potential, assessments, etc. is difficult and requires analytical skills and excellent organization. In this case, respondents appreciate the possibility of using AI for analysis. The third most frequently mentioned advantage is the speed of work (72%) which may especially concern different calculations.

When it comes to the main disadvantages that respondents pointed out, the lack of empathy and "human" approach appeared in the first place (82%). It is often mentioned that soft skills, communication, understanding of other people and empathy constitute the advantage of HR professionals. In second place was lack of understanding of complicated issues or statements by virtual assistants (72%). This is a generally highlighted drawback of chatbots, especially for languages with a high degree of difficulty and complexity of variations. In these cases, virtual assistants may not be taken seriously when they are unable to understand the employee during the conversation. The third most frequently mentioned disadvantage is the lack of creativity, yet only 48% agreed on that. More advantages and disadvantages may be found in Table 2.3.

Table 2.3. Advantages and disadvantages of using AI in HR processes

Advantages	Disadvantages
Possibility to automate routine tasks – 94%	Lack of empathy and "human" approach – 82%
Ability to analyse big data – 90%	Lack of understanding of complicated issues, statements by virtual assistants – 72%
Speed of operation – 72%	Lack of creativity – 48%
Elimination of so-called "human" errors – 66%	Difficulty in understanding and implementing software or algorithm – 32%

Ability to work 24 h a day – 56%	Machines taking people's jobs – 28%
Lack of emotion in decision-making – 48%	Others – 8% decreasing quality and quantity of relations between HR and employees availability, price
Others – 4% simplifying decision process, improving communication	

Source: own study.

Present and Future Use of Artificial Intelligence in HR Departments

Despite the above-mentioned statements about being supporters of the use of artificial intelligence in HR processes, respondents indicate that in almost none of the surveyed organizations AI is implemented in HR processes. 44% of respondents said that they do not use AI at all in HR departments, while 48% use it to a small extent. Only 6% use AI in several HR processes, and 2% in many processes. These are extremely small amounts, indicating that at the moment the level of use of artificial intelligence in the HR departments of Polish enterprises is dramatically low (Figure 2.3).

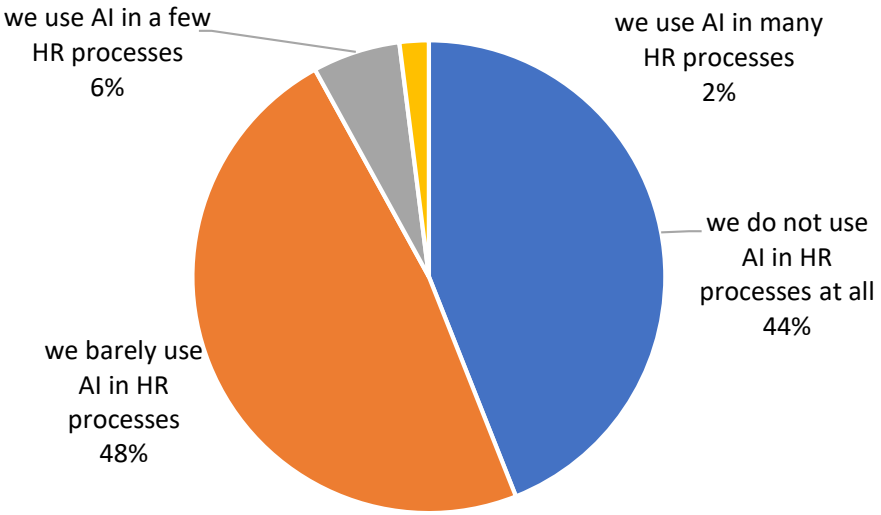

Figure 2.3. Present AI implementation in HR processes in researched companies

Source: own study.

The research indicates that in the near future, reaching up to 5 years, the situation will not change. 44% of organisations do not plan to implement Ai in HR processes at all. 14% plan to implement it in 1–2 years, and 8% plan to do it in 3–5 years. However, as much as 34% is still hesitating and have not decided yet on implementation (Figure 2.4).

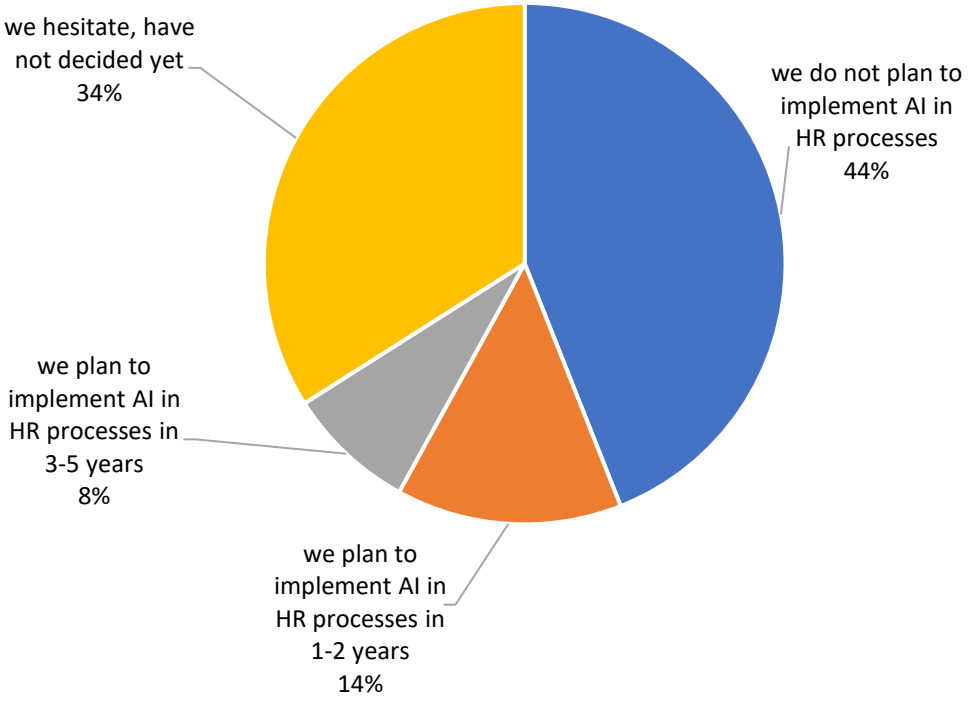

Figure 2.4. Future plans on AI implementation in HR processes in researched companies

Source: own study.

2.5. Discussion

Answering the first research question "What are the attitudes and state of knowledge of HR professionals in the field of artificial intelligence?" it can be stated that respondents were mostly supportive towards the idea. This coincides with research, e.g., on a group of HR professionals from Hungary, who were mostly supportive towards AI. In the same group, the absence of widespread fear of losing their job due to the use of robots was also confirmed (Karacsony, 2022). Other research state that possible hurdles in human workers and AI interactions may involve: resistance in accepting robots as team members, fear of losing the job, inability to communicate properly, problems with proper estimation of AI possibilities, differences connected with performance evaluation: humans are tired, need breaks (Arslan et al., 2022).

A large proportion of respondents believe that they have too little knowledge about artificial intelligence, which may cause resistance in their implementation. Research on other groups suggests that about half of employees are interested in implementing innovations in HR (Mubarakshina et al., 2022).

Considering the second research question "What are the advantages and disadvantages of the use of artificial intelligence in HR departments stated by HR professionals?" concerns about the lack of emotional, human approach to employees presented by respondents are also confirmed in other research groups (Meduri & Yadav, 2021; Palos-Sánchez et al., 2022). At the same time, respondents mentioned many benefits of using AI, which is confirmed also by other research (Karacsony, 2022).

The research has shown that few companies have implemented or plan to implement AI in HRM in the near future which is an answer to the third research question "What is the current state of AI implementation in HRM and what are the plans for the future?". This is confirmed by other studies stating that the application of AI has not advanced as expected in spite of growing number of publications and overall interest (Nankervis et al., 2021; Palos-Sánchez et al., 2022). Possible reasons are among others: concerns with data, lack of understanding how to use analytics, unclear governance, competing priorities (Bekken, 2019). What also remain is the necessity to comply with current and evolving legal authority (Gay & Kagan, 2018), which e.g. concern analysing employees' data or monitor their health and efficiency.

2.6. Conclusions

The research contributes to filling the research gap considering the state of adoption of artificial intelligence in HR departments as well as perceived advantages and disadvantages of such implementations. Generally supportive attitudes of HR employees may be a sign of future changes in this area.

In practical business terms, research contributes to a better understanding by companies what benefits and challenges are connected with AI adoption in HRM. The necessity for trainings for HR personnel and clear vision of managers should be underlined as practical recommendation from the research.

There are research limitations caused by:

- the deliberately selected and small sample which makes it impossible to make inferences about the entire population,
- predominance in the research sample very large organisations and organisations representing IT sector and services,
- a rapidly changing economic environment which requires innovation, which in turn may influence companies' decisions regarding faster HR transfomation then shown in the research.

Further research is needed to recognize transformation of HR departments, ways of cooperation between robots and human beings and needs of new generations entering job market with their digital competence and expectations.

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Wykorzystanie sztucznej inteligencji w procesach personalnych

Streszczenie: W ostatnich latach w organizacjach zaobserwowano dynamiczne zmiany wynikające z wykorzystania nowatorskich technologii. Zastosowanie sztucznej inteligencji do zarządzania zasobami ludzkimi to jeden z obszarów, który wzbudza wiele zainteresowania. Celem artykułu jest rozpoznanie stanu adaptacji AI w działach HR ze szczególnym uwzględnieniem zalet i wad, postaw i stanu wiedzy specjalistów HR w oparciu o wyniki przeglądu literatury oraz badań empirycznych. Przeprowadzono systematyczny przegląd literatury światowej z wykorzystaniem baz danych: Proquest, EBSCO, Emerald, JSTOR, Science Direct i BAZEKON. Wyniki zostały uzupełnione wnioskami z badań ilościowych przeprowadzonych na próbie 50 specjalistów HR. Najbardziej widoczne zastosowanie AI można zaobserwować w rekrutacji i selekcji, chociaż inne procesy HR również korzystają z zalet sztucznej inteligencji. AI może usprawnić pracę działów HR. Najczęściej wymienianą zaletą była możliwość automatyzacji rutynowych zadań, natomiast wśród wad przeważał brak empatii i „ludzkiego" podejścia. Niewiele firm wdrożyło lub planuje wdrożyć AI w ZZL w najbliższej przyszłości, co potwierdzają inne badania stwierdzające, że zastosowanie AI nie postępuje zgodnie z oczekiwaniami.

Słowa kluczowe: sztuczna inteligencja, dział HR, specjaliści HR, procesy HR