“Challenges and opportunities of artificial intelligence adoption in human resources management within the ICT industry in Armenia”

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ARTICLE INFO	Armen Grigoryan, Anahit Melkumyan, Lusine Karapetyan, Maria Sahakyan, Meri Badalyan and Bella Gabrielyan (2025). Challenges and opportunities of artificial intelligence adoption in human resources management within the ICT industry in Armenia. *Problems and Perspectives in Management*, *23*(4), 147-158. doi:10.21511/ppm.23(4).2025.11
DOI	http://dx.doi.org/10.21511/ppm.23(4).2025.11
RELEASED ON	Monday, 27 October 2025
RECEIVED ON	Thursday, 05 June 2025
ACCEPTED ON	Thursday, 09 October 2025

JOURNAL	"Problems and Perspectives in Management"
ISSN PRINT	1727-7051
ISSN ONLINE	1810-5467
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
58	3	4

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Type of the article: Research Article

Received on: 5th of June, 2025
Accepted on: 9th of October, 2025
Published on: 27th of October, 2025

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Conflict of interest statement:
Author(s) reported no conflict of interest

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CHALLENGES AND OPPORTUNITIES OF ARTIFICIAL INTELLIGENCE ADOPTION IN HUMAN RESOURCES MANAGEMENT WITHIN THE ICT INDUSTRY IN ARMENIA

Abstract

This study investigates the challenges and opportunities of artificial intelligence (AI) adoption in human resources management (HRM) within the ICT industry of Armenia. Utilizing a mixed-methods approach, the analysis is based on a structured survey and in-depth interviews conducted with 30 HR specialists from Armenian ICT companies in Yerevan between January and February 2025. The results of the expert survey were analyzed using descriptive statistics, frequency analysis, and cross-tabulation tests in SPSS software. The findings revealed significant opportunities for using AI in human resources management within the ICT sector. These opportunities include improving management processes for employees and saving time and financial resources through the effective use of artificial intelligence in HRM. However, there are also evident challenges, such as the comparatively slow rate of AI integration in HRM (only 43.4% use AI tools in HRM), and risks associated with human–AI imbalance (27.8%), information protection (27.8%), job displacement (18.5%), AI bias (16.7%), and resistance to change (9.3%). Nevertheless, the findings revealed no correlation between company size and the level of AI implementation in HRM (Pearson Chi-Square = 0.143, p = 0.931), which does not support the hypothesis of a 'digital divide' within the sector whereby larger companies are more likely to implement AI than small and medium-sized enterprises. The study highlights the importance of balancing AI technology with the human factor, developing ethical standards, investing in AI literacy, and implementing targeted training programs.

Keywords artificial intelligence, human resource management, ICT sector, Armenia, AI integration, challenges, opportunities

JEL Classification M54, M15

INTRODUCTION

Nowadays, the information and communication technology (ICT) sector plays an increasingly important role in the global economy, as it stimulates new jobs and transforms existing ones, and develops innovation and creativity in business (Kvochko, 2013). In the past few years, Armenia has been undergoing a digital transformation, and the digital sector has become one of the leading parts of the economy. The Armenian government declared the ICT sector a priority in 2000 and, since then, has implemented various support measures, including tax incentives, establishment of free economic zones, creation of the Ministry of High-Tech Industry, and development of the "Digitalization Strategy of Armenia for 2021–2025" (International Trade Administration, 2023; OECD, 2024). In 2023, Armenia's startup

ecosystem has gained recognition with a ranking of 15th in Eastern Europe and 57th globally according to StartupBlink, which is higher than some EU countries (Prime Minister of the Republic of Armenia, 2023; Gomonov et al., 2021). According to Innotechnics (2024), the country is considered a leader in the Caucasus region for startups.

However, a number of obstacles hinder further sustainable growth of the ICT sector in Armenia. Despite a strong tradition of technical education, there is a significant shortage of specialists needed to implement and use new technologies (World Bank Group, 2025). Although the relocation of tech professionals, especially from Ukraine, Belarus, and Russia, has significantly accelerated the development of the sector in 2022, the long-term future impact and sustainability of this factor is still a question (Modex, 2022).

One of the efficient ways to attract and retain talent in the ICT sector can be the use of artificial intelligence (AI) tools and digital technologies in human resource management (HRM). The impact of digitalization on HRM includes online recruitment and training, crowdsourcing, and knowledge management systems (Melkumyan & Sahakyan, 2022). Therefore, it is interesting to explore how bridging the talent gap in Armenia's ICT sector through AI in human resource management can ensure sustained growth.

1. LITERATURE REVIEW AND HYPOTHESES

A sufficient number of authors addressed and considered the issues of implementing artificial intelligence in different areas, but the studies conducted in the field of information technology and communication technologies in Armenia are very superficial. The main research concerns the application of AI in the education process, in the military industry and defense (Danielyan, 2025), in the process of managerial decision-making, and information management (Karapetyan, 2024), but there is very little research in the field of human resource management, especially in the information and communication industry. In addition, this research mainly highlights the existing problems, including the insufficient use of AI potential in various fields due to brain drain and other obstacles (Danielyan, 2025). It is worth concentrating attention also on studies that highlight not only the economic effects and risks of AI, but also the legal issues that could arise, emphasizing the need for a steady and harmonious development of not only technologies, but also the legal framework of the country to ensure increased positive effects (Zihang et al., 2021).

Recent research has shown that the implementation of AI tools in HRM can improve strategic positions and provide sustainable competitive advantages for companies (Prikshat et al., 2023; Ratner et al., 2025; Budhwar et al., 2022). Thus, Rigotti and Fosch-Villaronga (2024) and Nawaz et al. (2024) proved that the efficiency of AI in screening, attracting, evaluating, and interviewing candidates is very high due to the dramatic speed of information processing. Although the working logic of AI depends on specific algorithms created by humans, which can lead to biases, many studies claim that implementing AI in the recruitment process can reduce discrimination (Budhwar et al., 2022). Benefits of AI use in HRM include the reduction of the administrative burden in companies, acquiring talent, and predicting employee retention in the workplace (Lokande, 2025).

Some researchers focus on the issues of digitalization and AI implementation during recruitment (Kshetri, 2021), as well as in career and performance management (Gryncewicz et al., 2023), while others study the process of training and development of employees (Maity, 2019). AI can help HR managers design and deliver personalized learning and development programs for employees (Employer Flexible, 2025) and assess the level of staff engagement using a variety of survey and data collection methods (Minasyan & Petrosyan, 2024). There are advantageous implementations of digital tools and AI in training and education (Davenport, 2019).

According to several other studies (Sharma, 2021; Mer & Virdi, 2022), AI chatbots promote the reduction of onboarding time due to the effective integration of new employees in teams. Particularly,

http://dx.doi.org/10.21511/ppm.23(4).2025.11

chatbots can help new employees by providing contact details of new colleagues and information on professional training.

As the current process of gradual use of AI shows, its role in language training and other types of personalized training can increase. AI chatbots can organize personalized training and even forecast the efficiency of training (Chen, 2022). At the same time, other researchers consider the role of AI in the process of managerial decision-making (Leicht-Deobald et al., 2019) or during the process of assessing personnel performance (Claus, 2019). Some researchers have shown that psychologically, AI tool implementation does not cause demotivation, but leads to personnel turnover increase (Pan & Froese, 2023).

Organizations increase the efficiency of employee selection and hiring by implementing AI in human resource management, as AI helps to expand the human resource pool. The main limitation of AI, according to Kshetri (2021), is the lack of a scientific basis for its implementation.

One of the main aspects where AI can make a significant impact in HR is recruitment and selection. AI-powered algorithms can scan resumes and job applications to identify suitable candidates based on predefined criteria, reducing the time and effort required for manual screening (Maksudyan, 2024; Murugesan et al., 2023). AI tools such as Machine Learning, Deep Learning, and Natural Processing are filtering out the most relevant talent from the gigantic piles of CVs (Mugisha, 2024; Mer, 2023).

Statistics show that 72% of organizations face difficulties in finding workers with the necessary skills; in addition, they spend an average of 14–63 days and 500 USD on filling each vacant position (Blinnikova & Koyevich, 2020). Besides, 90% of employees believe AI is a time saver – particularly in reducing the number of repetitive tasks and giving staff more time to focus on difficult tasks (Nawrat, 2023). By automating and simplifying manual processes that affect employee experience, AI can reduce the amount of time HR professionals spend on administrative tasks and thus boost the time spent on high-value tasks only a human can do (Buchholz, 2023).

According to Venugopal et al. (2024), the use of AI tools in HRM comprises three stages: technocratic (usage), integrated (integration), and fully embedded (symbiosis). At the current stage of AI usage in HRM, there is a time to effectively prepare for further stages of integration and full embedding when job reductions significantly increase.

The application of AI tools can lead to the transformation of HRM functions, organizational, and work transformations. These will include such challenges as job reduction, biased algorithms, problems with data safety, and ethical concerns.

A more established debate in human resource management is about pluralistic or reciprocal approaches to human resource management (Venugopal et al., 2024), which mainly focus on management and employees as the main stakeholders, but argue that they should be considered in a social context. This emphasis was clearly expressed in the concept of "people-centered" personnel management (Boxall, 2021). In this context, the different interests of the main stakeholders (owners and employees) can be reconciled; otherwise, negative consequences may arise. Managing human resources for the common well-being arises from the fact that a fundamental responsibility of business is to effectively contribute to the sustainable development challenges that we collectively face. The common good can encompass both immediate communities and local and global society, but can include other living beings and our shared natural environment – the ecosystem.

Artificial intelligence (AI) skills guarantee higher wages by about 11%, while programming skills provide only 6% increase in salary (Alekseeva et al., 2021). Companies that implement artificial intelligence tools gain not only optimization, but also provide opportunities to integrate the company into the environment and social life more effectively (Patrício et al., 2024). It also contributes to responsible behavior toward society and improves corporate culture within the company.

As organizations increasingly move toward digitalizing their HR operations, it is crucial to understand the effects of AI on different aspects of HR. Still, AI identifies correlations between existing successful employees and their traits and

performance (Murugesan et al., 2023). According to Dan Beck, there are three key areas where AI is taking off within HR tech; they are the following (SAP, 2024):

- AI-driven insights provide insight into workforce dynamics;
- AI streamlines HR processes, from recruitment through onboarding to employee management, enhancing efficiency and reducing administrative burdens;
- solutions using AI help craft personalized employee experiences to foster engagement by understanding individual employee needs, wants, and styles.

Therefore, studies show that the advantages of AI models include predicting a candidate's suitability for a position based on the candidate's previous work experience or other known work factors, and that AI can help avoid "unconscious bias," promoting more diverse and inclusive teams in the future. However, it is controversial to claim that AI tools are unbiased, as there are algorithms that are programmed with certain principles that can also have "inherent" or prior biases.

However, the diffusion of AI tools in human capital management is still small. In part, this is due to a shortage of digital skills and a lack of specialized education. Some recent research proves that with better digital skills among the company's personnel, these companies are more likely to adopt AI technologies in the HR sphere more quickly and effectively (Agarwal, 2023). According to Eurostat (2024), there is a correlation between educational level and digital skills, as the smallest gap in digital knowledge and abilities is for persons with higher education. The largest gap in Europe was in Portugal (66%) and the smallest one in Estonia (12%). Therefore, the level of digitalization and the implementation of artificial intelligence tools are usually correlated with the level of education.

At the same time, education system improvement and comprehensive reforms in this sphere are mostly explained by the policies governments usually adopt. Studies have revealed that, though in the short run perspective, government spending on education is not effective, in the long run, these expenditures give solid results (Melkumyan et al., 2023). Thus, the more society invests in education, the more it gains in the future. At the same time, digitalization in any sphere is a consequence and a precondition for a high-quality education.

Therefore, the research on AI in human resource management is still very fragmented, with a need for more cohesive studies to understand the full impact of AI on HR functions. This fragmentation can hinder the effective implementation of AI technologies in HRM, especially in situations where the business lacks digital skills and experience in successful AI implementations.

The ICT industry has become a major driver of economic growth in Armenia, with a significant number of specialists employed and a high average salary (Davoyan, 2020). This shift is supported by the successful implementation of digital technologies in various industries and consequently contributes to the development of the economy in Armenia (Panasenko et al., 2019; Sergi et al., 2023; Melkumyan, 2024).

Moreover, the ICT sector in Armenia has seen a substantial increase in exports, particularly in computer services, which have become the dominant component of ICT exports. The growth rate of ICT service exports has surpassed the overall export growth of the country (Tadevosyan, 2024).

According to Armstat (2025) data, the number of people employed in the information and communication technology sector was quite high in Armenia, reaching up to 44,900 people, which is about 4% of the total number of employed. However, as in other post-Soviet countries, the sluggish and inertial education system does not allow for the prompt closing of the educational gap in the field of rapidly developing digital technologies (Aghajanyan et al., 2025). It creates a notable mismatch between the demand for ICT specialists and the output of the educational system. The number of graduates in ICT fields is insufficient, and the skills provided by educational institutions do not fully meet industry needs (Gevorgyan & Tumanyan, 2022). At the same time, larger companies experience

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fewer problems with staff training, as they have more opportunities to organize corporate training (Ratner et al., 2022; Revinova et al., 2020).

The aim of this study is to assess the level of AI implementation in human resource management in the ICT sector in the Republic of Armenia and identify the main risks and opportunities of digitalization.

Therefore, our hypotheses of the study are as follows:

H1: The size of the company affects the intensity of the use of AI tools in HRM in the Armenian ICT sector.

H2: Using AI in HRM is positively linked to the automation of different tasks.

2. METHODOLOGY

This study employs a mixed-methods approach, combining qualitative expert assessments and quantitative survey analysis to assess the adoption of artificial intelligence (AI) in human resource management (HRM) within the Armenian information and communication technology (ICT) sector. The primary data were collected through semi-structured interviews and a standardized questionnaire.

The research was conducted between January and February 2025 in Yerevan, Armenia. The choice of time and place was justified by the rapid growth of the ICT sector and the increasing interest in AI adoption within the country during this period. A total of 30 HR specialists from Armenian ICT companies were selected as expert participants. The selection criteria included:

- holding a middle or senior management position within an HR division;
- working for a company that has been operating in the market for at least five years;
- representation from all three national telecommunications service providers, as well as a diverse range of other IT organizations.

This purposeful sampling strategy was used to ensure that the participants had extensive experience and a deep understanding of the HRM landscape in Armenia's ICT sector. Given that only large and medium-sized enterprises typically have dedicated HR departments, the sample was intentionally skewed toward these larger companies. The composition of the expert panel is summarized in Table 1.

Table 1. The composition of the expert panel by the size of the company

Company size	Number of experts	Percentage of sample (%)
Large (> 250 employees)	19	63.3
Medium (50-249 employees)	6	20.0
Small (< 50 employees)	5	16.7
Total	30	100

In addition to the expert survey, in-depth interviews were conducted with a representative from the Republican Union of Employers of RA and three large ICT company representatives to provide further context and clarify information regarding companies that are members of this public organization.

The data collection process was twofold. First, a structured questionnaire was developed and refined through discussions with industry experts to ensure its relevance and conciseness. The questionnaire consisted of both open-ended and closed-ended questions designed to explore key issues related to AI implementation in HRM. The questions were carefully formulated to address the study's core hypotheses and research objectives (Table 2).

All participants provided informed consent prior to completing the survey and interviews. To ensure impartiality, anonymity and confidentiality, data were anonymized and aggregated, with no identifying information about individuals or their companies being recorded or presented. The research protocol was approved by the Ethics Committee of the Armenian State University of Economics under Protocol No. 2 dated January 21, 2025.

Both qualitative and quantitative methods were used to analyze the collected data. For the quan-

Table 2. Main questions included in the questionnaire

Variable	Question	Type of the question
Q1	Size of the company	Ranking: small/ middle/large
Q2	Age of respondent	Demographic
Q3	Use of AI in HRM of the company	Dichotomous: yes/no
Q4	Reasons for not using AI in HRM	Open-ended
Q5	Use of AI in specific areas of HRM	Multiple choices
Q6	Improvement of work efficiency due to AI	Open-ended
Q7	Evaluation of the improved work efficiency due to AI use	Open-ended
Q8	Automation of tasks as a result of AI use	Dichotomous: yes/no
Q9	How AI changed job performance	Open-ended
Q10	Impact of AI on the remuneration system	Open-ended
Q11	Training implementation related to the use of AI tools in HRM	Multiple choices
Q12	Potential risks of AI integration in HRM	Open-ended
Q13	Balancing AI with human factors to promote long-term objectives of HRM	Open-ended
Q14	Recommendations on the effective use of AI in human resources management	Open-ended

titative analysis, the survey results were processed using SPSS software. Statistical tests such as descriptive statistics, frequency analysis, and cross-tabulation tests (including Pearson's chi-squared and M-L chi-squared tests) were employed to identify trends, relationships, and statistical significance. This enabled us to test the study's hypotheses quantitatively.

For the qualitative analysis, thematic analysis was performed on the data from the open-ended questions and in-depth interviews. This enabled us to identify common opinions, challenges, and opportunities shared by the experts, providing critical insights that complement the quantitative findings. This dual-method approach ensures a comprehensive and robust analysis of the research problem.

3. RESULTS

The in-depth interview with experts from the Republican Union of Employers of RA revealed that only 30% of employers utilize artificial intelligence to enhance the efficiency of their HR departments. The remaining 70% had not integrated AI yet, primarily due to a lack of information and insufficient skills. This highlights the growing need for awareness-raising initiatives and targeted training programs to fill the gap and promote AI integration.

The results of the survey, which included 30 ICT companies, showed that most professionals in human resource management positions in the ICT sphere (more than 70% of respondents) believe that the implementation of AI will automate most of the operations and increase their personal performance. About 43.3% of the surveyed companies already use artificial intelligence in human resource management, while 56.7% still do not use AI in HRM. The companies, which used AI, reported on the application of AI tools in functions such as recruitment and staff selection, talent acquisition and onboarding, data analytics, training, and performance management.

The distribution of the companies by size and AI usage in human resource management is presented in Figure 1.

The shares of medium-sized companies using and not using AI tools in human resource management are equal (50% and 50%). Among small companies, the percentage of those that do not use AI tools is predominant (60% vs. 40%). Among large companies, almost 58% reported not using AI, while the others reported using AI in HRM.

However, applying Pearson's Chi-square and M-L Chi-square statistical tests shows that there is no statistically significant difference between companies of different sizes in the use of AI ($\chi^2 = 0.143$, $p = 0.931$ and $\chi^2 = 0.142$, $p = 0.931$). So, the first hypothesis (*H1*), which states that the size of the company can affect the intensity of the use of AI tools in HRM, can be rejected. This means that the decision to use AI depends primarily on those who manage the companies or the departments of human resource management. Simultaneously, the research has shown that the age of respondents did not affect the use of AI, as the main constraints

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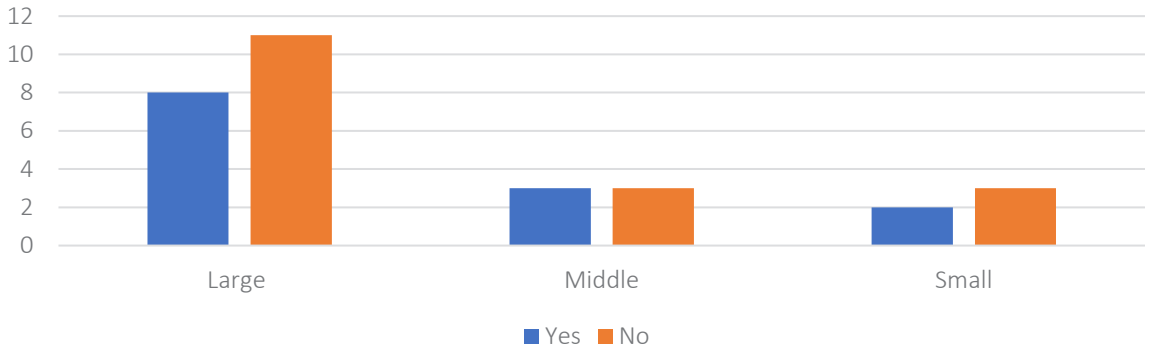

Figure 1. Distribution of the companies by size and AI usage in HRM

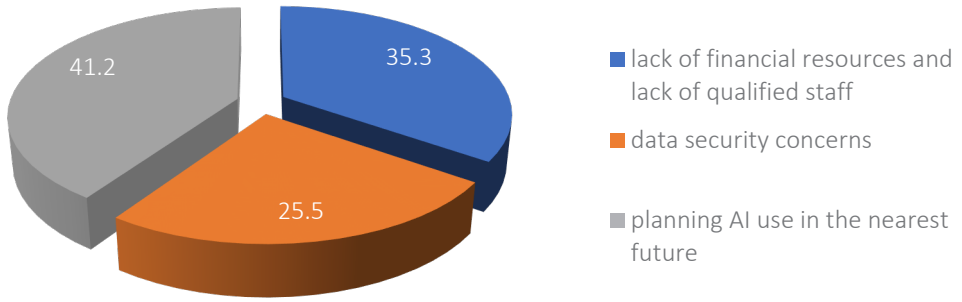

Figure 2. The most compelling reasons why AI is not yet being utilized in HRM

with the implementation of AI were connected to the lack of finance and skills.

Among the most compelling reasons why AI is not yet being utilized in HRM of the companies, respondents noted a lack of financial resources and qualified staff, as well as data security concerns. 41.2 % respondents claimed about planning AI use in the near future (Figure 2).

The respondents were also questioned about the implementation of training in companies related to the use of AI tools in HRM. The results obtained are presented in Table 3.

Table 3. Considering training implementation related to the use of AI tools in HRM

Response	Frequency	%
Yes	13	43.3
No	3	10.0
Not sure	10	33.3
We have already done	4	13.3
Total	30	100.0

Nearly 60% of surveyed companies are ready to implement training or have already done it, while the rest of the companies are not considering this opportunity or are not sure about it. At the same time, most of the respondents (58.3%) (multiple options have been chosen simultaneously) implement AI for recruitment, 43.3% for staff selection and talent acquisition, and others implement it for data analysis, employee engagement, and other processes.

As the analysis shows, using AI in human resources management significantly promoted the automation of different tasks. Pearson's Chi-square statistical test revealed this significant relationship (Table 4). This confirms the second hypothesis (*H2*) on the positive link between using artificial intelligence in HRM and the automation of tasks.

The distribution of responses (%) on the potential risks of AI integration in HRM is reflected in Figure 3 (multiple options were available).

As the data provided show, the highest risks of AI integration in HRM are related to the lack of balancing AI with the use of human factors (27.8%) and information protection concerns

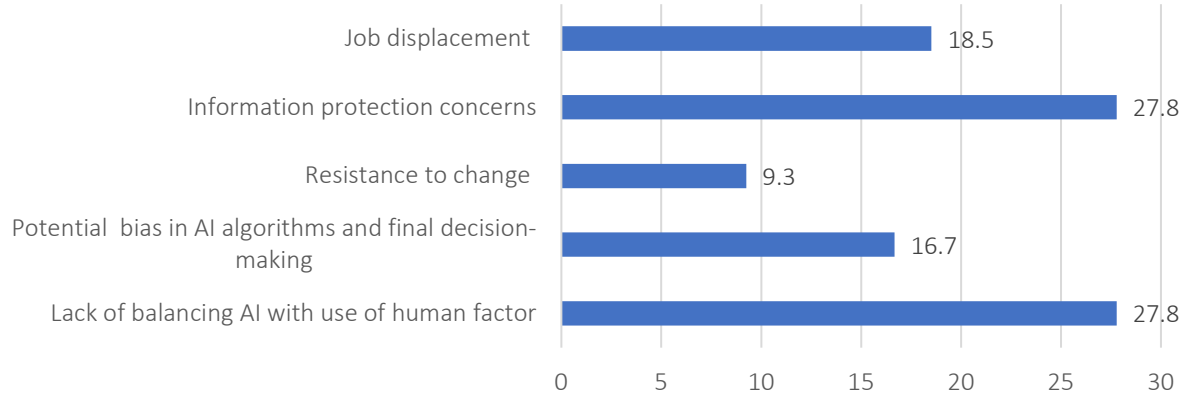

Figure 3. Distribution of responses (%) on the potential risks of AI integration in HRM

Table 4. Chi-Square tests

Hypotheses	The relationship between the variables	Pearson Chi-Square	P-value	Decision
H1	Q1 → Q3	0.143	0.931	Not supported
H2	Q3 → Q8	6.002	0.050	Supported

Note: Q1 = Size of the company; Q3 = Use of AI in HRM of the company; Q8 = Automation of tasks due to use of AI.

(27.8%). Job displacement (18.5%) is considered the next important risk of AI integration in HRM. Simultaneously, relatively lower risks were linked to potential bias in AI algorithms and final decision-making (16.7%) and resistance to change (9.3%). The interviews with professionals in this sphere have also revealed their belief that AI in HRM is going to enhance, not replace, human decision-making.

4. DISCUSSION

The high adoption rates of AI in recruitment and onboarding among Armenian ICT companies are consistent with global trends. The initial application of AI in these areas is often driven by a need for efficiency and automation of time-consuming, repetitive tasks. This finding aligns with Melkumyan and Sahakyan (2022), who highlighted the role of digitalization in streamlining these specific HRM functions.

However, the limited use of AI in more strategic functions, such as performance management and talent development, indicates that the sector is still in the early stages of a digital transformation. This can be interpreted as a focus on tactical, rather than strategic, AI implementation. This pattern is not unique to Armenia and is observed in many emerging tech markets where initial investment is directed toward areas with a clear and immediate return on investment (Ncube et al., 2025; Goel & Mishra, 2024).

The absence of statistical correlation between company size and AI adoption suggests that there is no 'digital divide' within the Armenian ICT sector. Typically, larger companies have greater financial and human resources and are therefore better positioned to overcome significant implementation barriers, such as high costs and the need for specialized skills. However, our findings do not corroborate the World Bank Group's (2025) observations regarding the general skills gap in Armenia, which suggests that this gap directly affects the ability of smaller enterprises to adopt advanced technologies. This is most likely because even large companies are still in the early stages of AI implementation in HRM.

The qualitative data on challenges, particularly data privacy and algorithmic bias, present a crucial point for future policy. These concerns are not unique to Armenia but are central to the global discourse on ethical AI (Sharma et al., 2023). The findings suggest that for AI adoption to become widespread and sustainable, it must be accompanied by robust ethical frameworks and a focus on building trust in these technologies.

These results have several important practical implications. They can be useful for policy makers, ICT

http://dx.doi.org/10.21511/ppm.23(4).2025.11

company management, universities, and training centers. First, supportive policies and initiatives can be created by government officials and institutions involved in workforce development, promoting technological integration in HR, strengthening education, and addressing skills gaps. Second, best practices for the effective implementation of AI tools in HRM functions can be recommended by business professionals advising companies on digital transformation.

When discussing the study's limitations, it should be acknowledged that it relies on self-reported information from experts and HR professionals about the use of AI tools and their assessments of these tools' effectiveness. This may introduce bias, as respondents may have different interpretations of AI integration and its impact, potentially skewing the results. However, this problem is universal for survey-based research.

CONCLUSION

The purpose of this study was to assess the level of AI implementation in human resource management (HRM) within the Armenian ICT sector and to identify the main opportunities and challenges associated with this specific type of digitalization.

The research found that the adoption of AI in HRM is still in its early stages, with a focus on automation of routine tasks. The majority of AI tool usage is concentrated in recruitment and onboarding, while more strategic functions like performance management and talent development show very low adoption rates. However, the findings did not reveal any significant "digital divide" within the sector, where larger companies are more likely to implement AI compared to small and medium-sized enterprises.

From these results, several conclusions can be drawn. The ICT sector in Armenia is beginning to leverage AI to address its talent challenges, but the implementation is primarily tactical rather than strategic. The slow rate of widespread adoption can be attributed to three critical barriers: first, a shortage of specialists with the necessary skills; second, the high cost of implementation; and third, persistent concerns over data privacy and ethical issues such as algorithmic bias. These obstacles hinder the sector's ability to utilize AI's full potential in bridging the talent gap and ensuring long-term sustainable growth.

Future research should focus on a deeper analysis of the factors driving the digital divide between large and small companies in Armenia. It would also be valuable to conduct a longitudinal study to track the evolution of AI adoption and its impact on employee productivity and job satisfaction over time. Additionally, research into developing a specific ethical framework for AI in HRM tailored to the Armenian legal and social context would provide a crucial foundation for responsible and effective implementation.

AUTHOR CONTRIBUTIONS

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