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ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT: FUTURE DEVELOPMENT PERSPECTIVES

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ШТУЧНИЙ ІНТЕЛЕКТ У КАДРОВОМУ МЕНЕДЖМЕНТІ: ПЕРСПЕКТИВИ РОЗВИТКУ НА МАЙБУТНЄ

Since the 2000s, unified solutions for personnel management have emerged in the market, utilizing artificial intelligence to automate processes related to recruitment, development, assessment, and personnel management. Currently, many companies are independently investing in the development and implementation of specialized technologies aimed at incorporating artificial intelligence in human resource management. This applies to both large and medium-sized enterprises across various industries. The proliferation of artificial intelligence in human resource management processes not only leads to specific changes in HR management but also expands capabilities in areas such as qualified talent acquisition, automation of training processes, employee interaction, productivity enhancement, and reduction of errors in HR operations, among others. Therefore, the research aims to identify the specifics of artificial intelligence utilization in human resource management and explore its future development prospects. It has been demonstrated that researching the issues related to the application of "artificial intelligence" in human resource management is of great significance. This research helps unlock the potential of this technology for optimizing personnel management and draw conclusions regarding its effectiveness and impact on various aspects of human resource management. Based on the research findings, it can be concluded that there are several promising directions for the development of artificial intelligence in human resource management. These directions include: increased automation of routine tasks; increasing automation of routine tasks; enhancing analytics (expanding analytical capabilities in areas such as workforce demand forecasting, identifying talented employees, and developing employee retention strategies); personalized employee development; effective talent management; expanding the use of artificial intelligence as a text analysis and speech analytics tool; expanding remote work opportunities; addressing ethical issues related to data privacy and regulation. The prospects for further research involve assessing the impact of artificial intelligence on human resource management and developing effective models and algorithms of artificial intelligence suitable for addressing complex human resource management tasks.

З початку 2000-х років на інформаційному ринку з'являються уніфіковані рішення для кадрового менеджменту, які використовують штучний інтелект для автоматизації процесів відбору, розвитку, оцінки та управління персоналом. Наразі багато компаній самостійно інвестують кошти у розробку та впровадження спеціалізованих технологій, спрямованих на використання штучного інтелекту в кадровому менеджменті. Це стосується як великих, так і середніх підприємств різних галузей. Процес розповсюдження штучного інтелекту в кадровому менеджменті призводить не лише до специфічних змін в управлінні людськими ресурсами, але і до розширення можливостей у сфері добору кваліфікованої робочої сили, автоматизації процесів навчання, покращення взаємодії з персоналом, підвищення продуктивності та зниження ризиків помилок у кадровій роботі й багато іншого. Отже, дослідження спрямоване на визначення особливостей використання штучного інтелекту у кадровому менеджменті та на вивчення перспектив його розвитку в майбутньому. Доведено, що дослідження проблем застосування "штучного інтелекту" у кадровому менеджменті має велике значення, оскільки воно допомагає розкрити потенціал цієї технології в оптимізації управління персоналом та зробити висновки щодо її ефективності та впливу на різні аспекти кадрового менеджменту. За результатами дослідження зроблено висновки, що наявна низка перспективних напрямків розвитку штучного інтелекту в кадровому менеджменті. Серед таких напрямків: зростання автоматизації рутинних завдань; покращення аналітики (а саме розширення аналітичних можливостей за сферами прогнозування потреб в робочій силі, ідентифікації талановитих співробітників та розробки стратегії збереження персоналу); персоналізований розвиток співробітників; ефективне управління талантами; розширення використання штучного інтелекту як засобу аналізу тексту і мовленнєвих аналітичних засобів; розширення можливостей для віддаленої роботи; розв'язання етичних питань, що пов'язані з конфіденційністю даних і їх регулюванням. Перспективи подальших досліджень полягають у вивченні впливу штучного інтелекту на кадровий менеджмент та в розробці ефективних моделей і алгоритмів штучного

інтелекту, придатних для розв'язання складних завдань у сфері кадрового менеджменту.

Keywords: *unified solutions; process automation; HR management; forecasting labor force needs.*

Ключові слова: *уніфіковані рішення; автоматизація процесів; управління персоналом; прогнозування потреб в робочій силі.*

Target setting. Since the 2000s, numerous specialized solutions and platforms for human resource management have emerged in the market, utilizing artificial intelligence to automate processes related to recruitment, development, assessment, and personnel management. These include recruitment and talent acquisition systems, learning and development management systems, performance assessment and analysis systems, as well as reporting and analytics generation systems. Currently, many companies are independently investing in the development and implementation of their own AI technologies in human resource management. These technologies include chatbots and virtual assistants that can provide answers to employee questions, and deliver information about company policies, procedures, and more, thereby enhancing accessibility and communication effectiveness with the personnel, among other benefits. It applies to both large and medium-sized enterprises across various industries. The outlined processes lead to specific changes in human resource management and expand capabilities in areas such as qualified talent acquisition, automation of training processes, employee interaction, productivity enhancement, and reduction of errors in HR operations.

Analysis of research and publications. Researching the issues related to the application of "artificial intelligence" in human resource management is of great significance because it helps unlock the potential of this technology for optimizing personnel management and draw conclusions regarding its effectiveness and impact on various aspects of human resource management. Today these questions are being researched by Bey H.V., Seredi H.V., Mishchuk H.Yu., Doroshkevych D.V., and

Lytvynenko I.S. The recommendations and conclusions formulated by these researchers have shaped the body of knowledge that helps to understand the specifics of using artificial intelligence in human resource management. However, the insufficient attention to the nuances of this process does not allow for a clear delineation of the future development prospects of artificial intelligence.

The wording of the purposes of article (problem). The purpose of the article is to determine the specifics of using artificial intelligence in human resource management and identify its development prospects for the future.

The paper main body with full reasoning of academic Within the scope of the research, the focus is on the use of artificial intelligence (AI) in human resource management as a phenomenon involves the computer programs use and systems to automate and improve various aspects of personnel management and HR processes within organizations.

The AI in this field encompasses a range of technologies, tools, and applications aimed at optimizing processes, increasing productivity, and enhancing managerial decision-making. Indeed, the use of AI in this area includes human capital management (HCM) systems, data analysis and business intelligence tools, chatbots and virtual assistants, talent management systems (such as Talent soft or Cornerstone OnDemand, which utilize AI for talent development, succession planning, and skill and competency management [6]), employee attrition risk assessment systems, candidate selection automation applications, automated document and form processing systems, time and productivity monitoring, and more.

The main aspects of using AI in human resource management include [1-2; 6]:

1. Using artificial intelligence for automated candidate selection, resume analysis, conducting tests, and interviews through chatbots.
2. Using artificial intelligence to analyze employee training needs, create individual training plans, and provide training through online courses and interactive systems.
3. Using artificial intelligence to analyze employee performance data and provide recommendations for improving their productivity.

4. Using artificial intelligence to analyze personnel data, forecast staffing needs, and develop strategic plans.
5. Using chatbots and virtual assistants to provide information to employees, answer their questions, and streamline communication within the organization.
6. Using artificial intelligence to automate document processing, payroll calculations, HR documentation management, and other routine tasks.
7. Using artificial intelligence to ensure data confidentiality in human resource management.

By combining the aspects outlined above (Figure 1), artificial intelligence helps improve the efficiency, accuracy, and productivity of personnel management by simplifying many processes and allowing HR specialists to dedicate more time to strategic aspects of management.

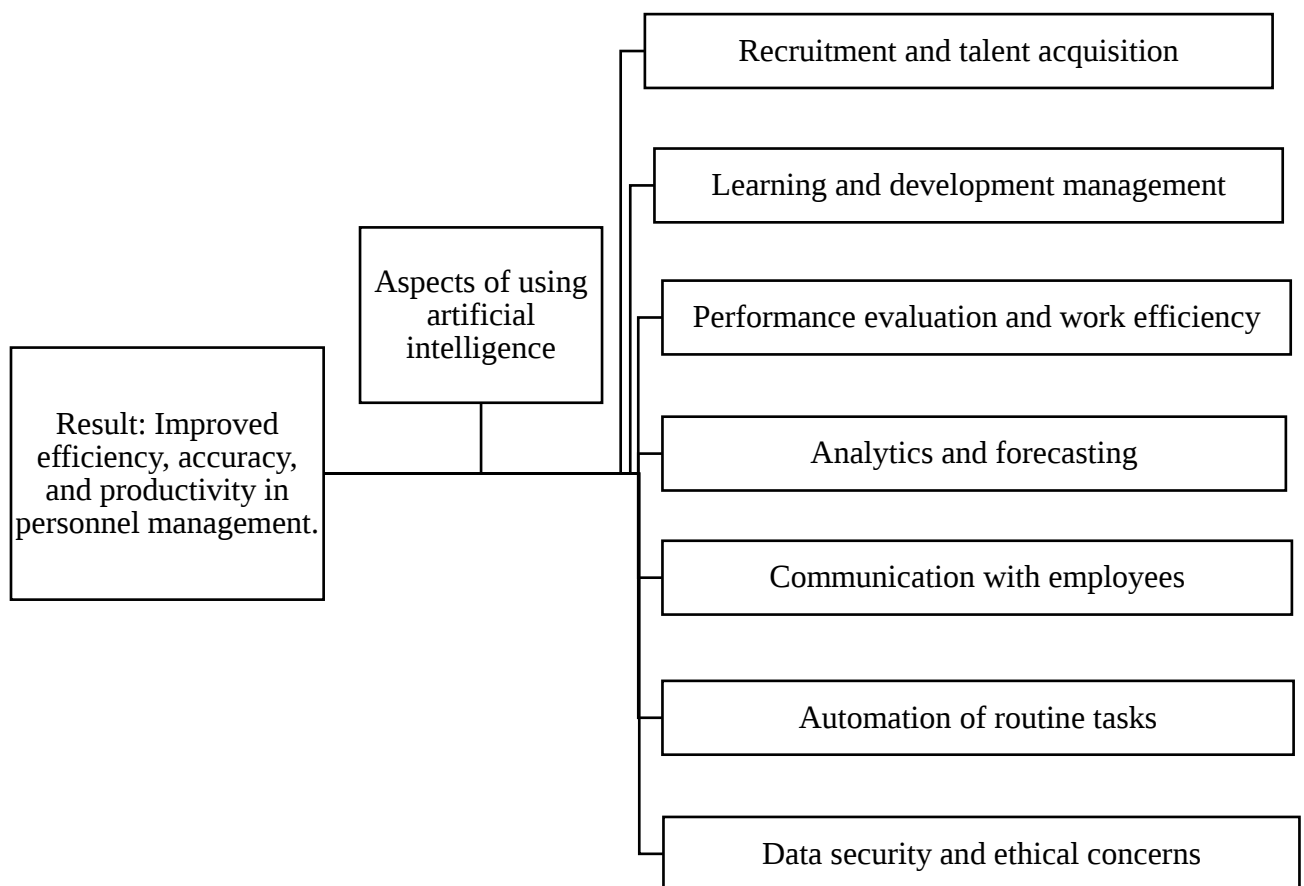


Figure 1. Key aspects of using AI in human resource management

Source: formed based on [1-2; 6]

In this case, the outlined result is achieved through specific artificial intelligence tools, including:

1. Personnel selection. It is because the use of AI in this field can significantly streamline and improve the candidate selection process, thanks to the ability to analyze resumes and candidate data for the position, conduct interviews through chatbots, create recommendation systems for HR departments, and minimize human intervention in personnel management. So, a description of AI tools to facilitate and improve the candidate selection process is provided in Table 1.

Table 1. Characteristics of AI tools to facilitate and improve the candidate selection process.

Means of artificial intelligence	Advantages of artificial intelligence	Application features
Analysis of resumes and data of candidates	Artificial intelligence can quickly and efficiently analyze large volumes of data, including resumes candidates and other information they provide	Using machine learning algorithms to identify key skills, experience, and education that match the requirements of a job vacancy
Interviews through chatbots	AI can conduct interviews with candidates through virtual assistants or chatbots	AI can pose questions to candidates, analyze their responses, evaluate their communication skills, logic, and real-time problem-solving abilities
Recommendation Systems	AI can provide recommendations to the HR department	AI can provide recommendations for the most suitable candidates for specific job vacancies
Minimizing human intervention	The use of AI in personnel recruitment.	AI can reduce the influence of human factors and subjective evaluations, helping to ensure a more objective and rational selection of candidates
Saving time and resources	Automation of the candidate selection process using AI.	AI allows the HR department to save time and resources that can be allocated to more important tasks

Source: formed based on [2-3; 4; 6]

The use of AI in the candidate selection process allows for increased efficiency and accuracy in results by achieving maximum alignment between candidates and job vacancies [2].

Employee assessment. Specifically, AI can track employee productivity based on data from accounting systems and workflow monitoring (Table 2).

Table 2. Characteristics of AI tools for employee assessment

Means of artificial intelligence	Advantages of artificial intelligence	Application features
Monitoring productivity	AI can automatically track working hours, tasks, and employee work based on data from accounting systems and workflow monitoring	AI allows for collecting objective data about their productivity
Analysis of work habits and results	AI can analyze the work habits and results of employees	AI enables the identification of strengths and weaknesses, as well as opportunities for improving productivity.
Continuous feedback and recommendations	Based on the collected data, AI can provide continuous feedback to employees and management	AI provides recommendations for improving results and career development.
Assessment of achievements and goals	AI helps assess employees' achievements in the context of their goals and tasks.	AI allows for tracking achieved goals and identifying areas that need improvement.
Development and learning	AI can recommend individual learning plans and educational resources for employees.	AI helps employees enhance their skills and advance their careers.
Talent management and career path movement	AI helps identify talented employees	AI allows for selecting talented employees for more responsible tasks or career advancement

Source: formed based on [1; 3-4]

Employee assessment tools based on AI enable organizations to understand and evaluate their internal resources, improve workforce efficiency, and make more objective decisions regarding employee development. The results can be used to create recommendations for enhancing performance and advancing the careers of employees.

Learning and Development Management. The use of artificial intelligence (AI) in the field of learning and personnel development management includes numerous tools and capabilities that contribute to improving the quality and efficiency of educational processes (Table 3).

Table 3. Characteristics of AI tools for learning and development management

Means of artificial intelligence	Advantages of artificial intelligence	Application features
Analysis of training needs	AI can analyze data on the skills, knowledge, and training of each employee, determining their current learning needs.	AI allows for the identification of weaknesses and areas for improvement
Development of individual learning plans	Based on the analysis, AI can create individual learning plans	AI enables the creation of individual learning plans for each employee, considering their goals and needs
Assignment of learning materials and courses	AI can recommend specific learning materials, courses, and training for each employee	AI allows for the generation of personalized learning recommendations for each employee based on their needs and knowledge level
Automated access to educational resources	AI can provide employees with automated access to learning materials and platforms	AI streamlines the learning process
Progress tracking	AI tracks the progress of employees during training.	AI ensures the tracking of grades, assignments, and course attendance
Personalized learning experience	AI can adapt learning material.	AI adapts learning materials to each employee's individual needs and knowledge level.
Analysis of training effectiveness	AI helps evaluate the effectiveness of training programs and materials.	AI provides recommendations for improving the effectiveness of learning.
Reminders and notifications	AI can send notifications and reminders to employees	AI allows for setting notifications for incomplete courses or important dates

Source: formed based on [2; 6]

The tools outlined in the table for learning and development management allow organizations to provide a more effective, personalized, and results-oriented approach to the training and development of their personnel [5].

2. Automation of Routine Tasks. Artificial Intelligence can be used to automate HR documentation management, with its built-in tools for processing leave requests, calculating salaries, and other routine tasks, freeing up HR department resources for more complex tasks. Among how AI can assist in this context [1; 5-6]:

- Processing vacation requests (AI can automate the submission and approval process of vacation requests).
- Salary calculation (AI can automate salary calculations based on predefined formulas and rules)/
- Document management (AI allows for the storage and management of all HR documentation in electronic form).

- Time and attendance monitoring (AI can track employees' working hours, automatically record check-in and check-out times, and generate attendance reports).
- Automated reporting (the system can generate various reports and analytical information, simplifying decision-making processes in the HR department).
- Efficiency and cost control of labor expenses/
- Simplifying terminations and retirement processes (AI assists in managing termination and retirement processes, including processing relevant documentation and data transformation).

3. Analytics and forecasting. AI has tools to analyze large volumes of data about employees and generate analytical reports and forecasts on staffing needs, employee turnover, and other critical aspects as management requires. Among such tools [6]:

- Data collection and processing (AI can automatically gather data about employees from various sources, such as databases, human resource management systems, electronic surveys, etc. [5]).
- Data analytics (AI can use various algorithms to analyze data).
- Forecast modeling (AI can create models to forecast staffing needs based on historical data and other factors, such as company development plans, market demand, etc.).
- Generating analytical reports (AI can automatically generate analytical reports based on processed data and analysis results).
- Recommendations and optimization (AI can provide recommendations for optimizing human resource management processes).

Using these tools, AI can help an organization improve human resource management, reduce costs, and enhance business efficiency.

4. Data security assurance: AI has tools to help detect and prevent data security breaches, as well as identify unauthorized activity in human resource management systems.

5. Employee Engagement and Communication. So, through chatbots or automated employee service systems, AI can interact with employees, answer their

queries, and provide information about company policies and procedures. It is facilitated by tools, as summarized in Table 4.

Table 4. Characteristics of AI tools for employee engagement and communication

Means of artificial intelligence	Advantages of artificial intelligence	Application features
Chatbots for answering questions	AI can create chatbots available to employees around the clock.	Chatbots can provide answers to common questions related to company policies, benefits, procedures, and other information.
Real-time messaging and notifications	AI can send notifications to employees.	AI allows for the creation of important event notifications, such as announcements, changes in company policies, project summaries, and more.
Employee service systems	AI can provide employees with automated service systems.	AI enables the creation of internal systems through which employees can submit requests, vacation applications, update personal information, and access necessary information.
Employee engagement initiatives	AI can contribute to engaging employees in specific initiatives.	AI simplifies the process of engaging employees in surveys, satisfaction assessments, feedback collection, and other actions that contribute to improving the work environment and communication.
Support for remote workforce	AI can provide tools for communication and coordination, enhancing remote work for employees.	AI streamlines operations with remote teams.

Source: formed based on [5-6]

Thanks to the tools highlighted in the table, artificial intelligence helps improve communication between the company and its personnel, providing fast and accessible information while enhancing employee engagement and satisfaction [6]. Considering the points mentioned above, it's evident that artificial intelligence in human resource management has the following prospects: increased automation, improved analytics, personalized employee development, effective talent management, expanded use as a text and speech analytics tool, enhanced remote work capabilities, ethical considerations, and regulation.

In general, we believe that artificial intelligence in human resource management will continue to evolve and open new opportunities for personnel management and supporting organizational strategic goals (through the expansion of functionality, personalization of interfaces, increased computational capabilities, enhanced process optimization capabilities, increased interaction with employees, and more [5-6]). It is

crucial to consider the ethical and security aspects of using AI in this field and adhere to the highest standards of confidentiality and fairness when implementing these technologies.

Conclusions from this study and prospects for further exploration in this area. Note that the role of artificial intelligence in human resource management will continue to evolve and expand, leveraging a wide range of technological innovations. In line with the content of AI applications and its inherent tools in HR, several promising directions for development can be identified, including:

1. Increased automation: In the future, AI will further automate routine tasks in human resource management to free up HR professionals' time for strategic tasks.
2. Enhanced analytical capabilities: AI will provide more analytical capabilities for human resource management, including areas such as workforce demand forecasting, talent identification, and employee retention strategy development.
3. Personalized employee development: AI will assist in creating individualized development plans for each employee.
4. Effective talent management: AI will help identify and develop potential leaders and talented employees.
5. Expansion of text and speech analytics utilization: AI will provide more text analysis capabilities for assessing resume quality, analyzing employee feedback, and interactions with employees through textual content.
6. Increased remote work: With the growth of remote work, AI will be used to facilitate communication, task management, and monitoring of the productivity of remote employees.
7. Ethical considerations and regulation: AI will assist in addressing ethical issues related to employee data privacy and fairness in decision-making.

Prospects for further research include assessing the impact of artificial intelligence on human resource management and developing effective models and algorithms of artificial intelligence suitable for solving complex HR tasks.

Література

1. Бей Г.В., Серeda Г.В. Трансформація HR-технологій під впливом цифровізації бізнес-процесів. *Економіка і організація управління*. 2019. Вип. 2. С. 93-101.
2. Дорошкевич Д. В., Литвиненко І. С. Аналіз викликів для менеджменту через активацію застосування штучного інтелекту в діджитал суспільстві, *Ефективна економіка*. 2022, Вип. 1, URL http://www.economy.nayka.com.ua/pdf/1_2022/8.pdf
3. Жуковська В. М. Цифрові технології в управлінні персоналом: сутність, тенденції, розвиток. Науковий вісник Міжнародного гуманітарного університету. 2017. Вип. 2. С. 13–17.
4. Інноваційні засади управління людськими ресурсами: можливості, виклики, пріоритети досягнення соціально- економічної безпеки : колективна монографія / за наук. редакцією д. е. н., професора Міщук Г. Ю. Рівне : НУВГП, 2020. 408 с.
5. Невмержицька С. М., Петрусенко О.О. Проблеми оцінки ефективності системи управління персоналом. *Формування ринкових відносин в Україні*, 2014. Вип. 3 (154). С. 185–188.
6. Пчелянський Д.П., Воїнова С.А. Штучний інтелект: перспективи та тенденції розвитку. *Automation of technological and business processes*. 2019, Вип. 3. С. 59-64.

References

1. Bay, G.V. and Sereda, G.V. (2019), "Transformation of HR technologies under the influence of digitalization of business processes", *Ekonomika i orhanizatsiya upravlinnya*. Vol 2, pp. 93-101.
2. Doroshkevich, D.V. and Lytvynenko, I.S. (2022), "Analysis of challenges for management due to the activation of the use of artificial intelligence in the digital society", *Efektyvna ekonomika*, vol. 1, Available at.: http://www.economy.nayka.com.ua/pdf/1_2022/8.pdf (Accessed 25 Sept 2023).

3. Zhukovska, V.M. (2017), “Digital technologies in personnel management: essence, trends, development”, *Naukovyy visnyk Mizhnarodnoho humanitarnoho universytetu*, vol. 2, pp. 13–17.
4. Mischuk, G.U. (2020), *Innovaciyni zasady upravlinnya liudskymy resursami: mojlyvosti, vyklyky, proprytety dosyagnennya sotsialno-economichnoyi bezpeky* [Innovative principles of human resources management: opportunities, challenges, priorities of achievement], NUVGP, Rivne, Ukraine
5. Nevmerzhitska, S. M. and Petrusenko, O. O. (2014), “Problems of evaluating the effectiveness of the personnel management system”, *Formuvannya rynkovykh vidnosyn v Ukrayini*, vol 3 (154), pp. 185–188.
6. Pchelyanski, D.P. and Voynova, S.A. (2019), “Artificial intelligence: perspectives and trends of development”, *Automation of technological and business processes*, vol. 3, pp. 59-64.

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