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MANAGING THE RISKS OF INTEGRATING ARTIFICIAL INTELLIGENCE INTO HR SOFTWARE

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ABSTRACT

Background: *This paper explores the effects of implementing AI in HR software, analyzing the critical balance between augmentation of human capabilities (augmentation) and substitution of administrative roles (substitution). The aim is to define the main organizational risks and propose a conceptual framework for their management.* ***Objectives:*** *This paper explores the effects of AI implementation in HR software, analyzing the critical balance between augmentation and substitution, and aims to define the main organizational risks and propose a conceptual framework for their management.* ***Methodology:*** *The study is based on a conceptual analysis and review of scientific literature, institutional reports and market research for the period 2023–2025. The analysis integrates the task-based framework for technological change and the current regulatory requirements of the EU AI Act.* ***Results:*** *Three key challenges are identified: the high risk of automation of basic HR roles, algorithmic bias in processes, and lack of trust in automated systems. As an original contribution, the paper develops and implements a four-stage model for managing AI integration. The model filters tasks by their impact type and suggests specific management interventions (proactive retraining, algorithm audit, and explainable AI).* ***Conclusions:*** *Successful implementation of AI in HR is not purely a technological issue, but primarily a management one. An augmentation-first strategy ensures sustainability, regulatory compliance, and maximum return on investment, while maintaining a sense of procedural fairness among employees.*

Keywords: artificial intelligence, HR software, HR automation, algorithmic bias, risk management, reskilling, augmentation.
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INTRODUCTION

Artificial intelligence (AI) has been rapidly integrated into HR software platforms at a pace that would have been difficult to predict even three years ago. Since 2023, leading vendors such as Workday, SAP SuccessFactors, and UKG have incorporated generative AI capabilities directly into their solutions for talent acquisition, performance management, and benefits administration. The effects of this transformation are already evident in organizational practice and extend far beyond technological experimentation.

Human resource and benefits management provides a particularly valuable context for examining the impact of AI because it combines two characteristics that are often difficult to reconcile. On the one hand, many HR-related activities are administrative, repetitive, and highly standardized, including benefits administration, compensation processing, and regulatory compliance monitoring. Such activities are particularly susceptible to automation. On the other hand, decisions related to employee benefits directly affect

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employee well-being and often require contextual understanding, professional judgment, and, in some cases, direct human interaction. This combination makes the HR and benefits domain both an attractive application area for AI and a highly sensitive environment in which implementation errors may have significant consequences.

This paper examines the impact of artificial intelligence on HR software solutions used for workforce administration, benefits management, and compensation processes, with a particular focus on the organizational implications of AI adoption. It addresses the following research question: What practical challenges arise from the implementation of AI in HR software, and how can these challenges be effectively managed at the organizational level? The analysis focuses on three key challenges, their organizational consequences, and potential management strategies, drawing on evidence published between 2023 and 2025. Although AI offers substantial opportunities for improving organizational efficiency and decision-making, its implementation also raises important operational, ethical, and regulatory concerns.

Artificial intelligence is not used solely for the automation of administrative activities. Recent evidence suggests that, when implemented appropriately, AI can improve the efficiency of HR functions, support decision-making processes, and enhance the overall employee experience. Among the most frequently cited benefits are: automation of routine administrative processes, allowing HR professionals to focus on higher-value strategic activities; reduction of errors in compensation, benefits, and payroll administration processes; prediction of employee turnover and support for workforce planning activities; personalized recommendations for learning, career development, and employee benefits; improved access to information through AI-powered assistants and catboats.

According to the IBM Institute for Business Value (2024), organizations that have adopted generative AI in HR processes report increased HR team productivity and faster access to employee-related information. Similarly, analyses by the McKinsey Global Institute (2025) indicate that the greatest value is achieved when AI is designed to augment human capabilities rather than replace human expertise entirely.

Empirical evidence further suggests that the benefits of generative AI are particularly pronounced among less experienced employees, as AI-supported tools improve task performance and increase productivity (Borissova et al., 2024, Brynjolfsson, Li, & Raymond, 2025). These findings support the view that AI can function as a capability-enhancing technology rather than merely a mechanism for labor substitution.

Consequently, the central question is no longer whether AI should be adopted in HR software, but rather how it should be implemented in a way that maximizes its benefits while minimizing associated risks. These risks and organizational challenges constitute the primary focus of the following sections.

RESEARCH APPROACH

This study adopts a conceptual and literature-based research approach. The analysis is based on academic publications, institutional reports, regulatory documents, and industry studies published between 2023 and 2025. Sources were selected according to their relevance to the implementation of artificial intelligence in HR

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software, workforce administration, benefits management, and compensation processes. The reviewed literature was synthesized to identify key implementation challenges, evaluate their organizational consequences, and assess potential management responses.

THEORETICAL FRAMEWORK

Within the task-based framework, the net impact of technological change on employment depends on the relative strength of two competing processes: the augmentation of human labor and its substitution by technology (Acemoglu & Restrepo, 2019, Borissova et al., 2025). The debate surrounding the effects of artificial intelligence on employment can largely be reduced to these two scenarios. In the first, AI enhances human capabilities by enabling employees to process larger volumes of information, make better-informed decisions, and reduce the time spent on low-value activities. In the second, AI substitutes human labor by performing tasks more efficiently and at a lower cost. According to the task-based framework, the overall employment effect depends on which of these mechanisms dominates (Acemoglu, 2025, Borissova et al., 2020A).

Recent research suggests that technological progress has historically generated new categories of work that partially offset the employment effects of automation (Autor et al., 2024, Borissova et al., 2020B). This implies that the impact of AI should not be evaluated solely in terms of the number of automated tasks, but also in relation to the economy's capacity to create new forms of employment and new occupational roles.

The distinction between augmentation and substitution is particularly visible in the context of HR software and benefits administration. Automated benefits administration, AI-powered employee support chatbots, and algorithmic compensation calculations represent clear examples of task substitution. More complex applications, however, such as employee turnover prediction models, personalized benefits recommendations, and AI-assisted workforce planning tools, primarily enhance the analytical capabilities of HR professionals rather than replace them. The challenge is that organizations rarely make this distinction explicitly when implementing AI technologies, despite its importance for long-term workforce outcomes.

The scale of investment in HR technologies illustrates the pace of ongoing transformation. The global HR technology market was valued at approximately USD 40 billion in 2024 and is projected to exceed USD 81 billion by 2032 (Fortune Business Insights, 2024) (Figure 1).

A similar trend can be observed in organizational practice. According to a survey conducted by SHRM (2025) among 2,040 HR professionals in the United States, 43% of organizations reported using AI in at least one HR function, compared with 26% a year earlier. This represents a substantial increase within a relatively short period (Figure 2).

Furthermore, analyses by the McKinsey Global Institute (2025) suggest that generative AI has the potential to automate a significant share of routine work activities, including many administrative tasks commonly associated with HR functions. Given the speed of adoption and the scale of expected impact, the risks

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associated with rushed or poorly managed AI implementation should no longer be viewed as hypothetical. Instead, they represent practical organizational challenges that require proactive management and governance.

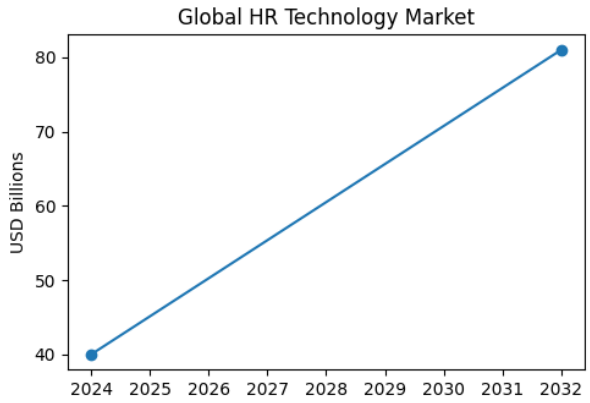

Figure 1. Forecast of Global HR Technology Market Growth (2024–2032)

Source: Author's visualization based on data from Fortune Business Insights (2024)

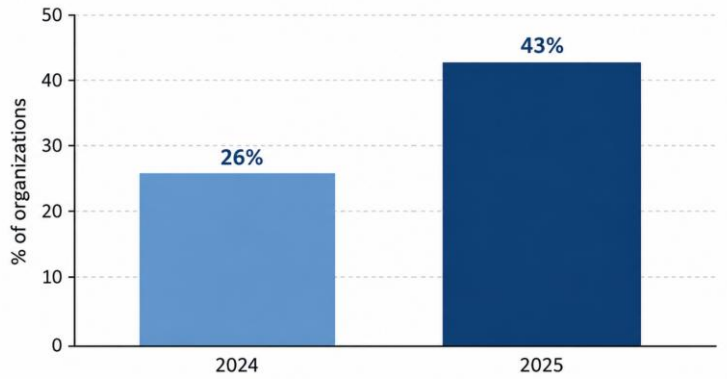

Figure 2. Organizations Using AI in at Least One HR Function (2024–2025)

Source: Developed by the author based on SHRM (2025 Talent Trends: Artificial Intelligence in HR)

KEY CHALLENGES OF AI IMPLEMENTATION IN HR SOFTWARE

Challenge 1: High Risk of Automation of Administrative HR Roles

Administrative HR roles represent the category most directly and measurably exposed to the effects of automation. According to the World Economic Forum (2025), approximately 92 million jobs worldwide may be displaced by automation by 2030, with administrative and transactional occupations among the most affected. Within the HR and benefits domain, this includes activities such as benefits data entry, compensation processing, responding to standardized employee inquiries, coordinating mandatory training programs, and basic compliance monitoring.

Similar concerns are reflected in OECD analyses, which emphasize that highly routine tasks face a greater risk of automation, while activities requiring social, analytical, and interpersonal skills remain less vulnerable (OECD, 2024). Likewise, the International Labour Organization (ILO, 2024) argues that the most likely

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outcome is not the complete replacement of human labor but rather the transformation of existing occupations through the integration of AI-enabled tools.

The McKinsey Global Institute (2025) estimates that generative AI has the potential to automate work activities accounting for 60–70% of employees' time in routine functions, compared with previous estimates of approximately 50% for traditional automation technologies. Platforms such as Workday Assistant, SAP Joule, and Microsoft Copilot for HR already automate a substantial portion of these activities in real organizational settings. Consequently, the discussion is no longer about future possibilities but about technologies that are currently being deployed and used in practice.

The immediate consequence of this development is the restructuring of HR teams. Organizations adopting AI technologies tend to reduce the number of administrative positions while simultaneously increasing demand for professionals with a combination of HR expertise and technological competencies. The World Economic Forum (2025) projects that although approximately 92 million jobs may be displaced globally, around 170 million new positions could emerge, many of which will require more advanced skills and qualifications.

While the overall employment effect may remain positive, its distribution is unlikely to be uniform. Employees occupying administrative roles without access to reskilling opportunities are exposed to disproportionately high levels of risk. This represents one of the most significant social challenges associated with AI adoption in HR functions.

Additional evidence from SHRM (2025) suggests that certain HR-related activities face a comparatively higher risk of automation than the average across the broader economy, particularly in environments where organizational and regulatory constraints on substitution remain limited.

Challenge 2: Algorithmic Bias in HR and Benefits Processes

Algorithmic bias is among the most significant yet often underestimated risks associated with the implementation of AI in HR. AI systems trained on historical data do not merely reflect past patterns; they can also reinforce and reproduce them in future decision-making processes. For example, if historical hiring data systematically favored or disadvantaged specific demographic groups, AI models trained on such data may replicate those patterns.

A systematic review by Albaroudi et al. (2024) found that AI-based résumé screening systems are particularly vulnerable to various forms of algorithmic bias, potentially generating adverse consequences for both organizations and society. Within the HR and benefits context, specific risks include candidate screening tools that discriminate based on gender, age, or ethnicity; performance evaluation systems that generate systematically different outcomes across demographic groups; and recommendation engines that suggest different benefits packages to employees with otherwise comparable profiles.

The authors emphasize the importance of maintaining meaningful human oversight throughout the decision-making process as a critical mechanism for mitigating discriminatory outcomes and promoting fairness.

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The European Union Artificial Intelligence Act classifies AI systems used for recruitment, employment management, and performance evaluation as high-risk applications (European Union, 2024). Such systems are subject to strict requirements regarding transparency, documentation, risk management, and human oversight. Non-compliance may result in penalties of up to 3% of an organization's global annual turnover.

These regulatory developments highlight the significance of algorithmic bias not only as an ethical concern but also as a substantial legal and organizational risk. Failure to address bias effectively may expose organizations to reputational damage, regulatory sanctions, and reduced employee trust.

Challenge 3: Lack of Trust in AI-Based HR Systems

Even technologically advanced AI systems are unlikely to deliver meaningful organizational value if employees and managers do not trust them. Existing research consistently identifies transparency as a key determinant of AI acceptance, while opaque decision-making processes undermine confidence in algorithmic recommendations and outcomes.

According to the IBM Institute for Business Value (2024), 61% of HR leaders identify trust in AI systems as one of the most significant challenges associated with implementation. This issue is particularly relevant in benefits administration, where decisions often have direct financial implications for employees.

Consequences

A lack of trust generates tangible organizational costs. Systems perceived as unreliable tend to be used only formally or bypassed entirely, reducing the return on investment associated with AI adoption. Managers who do not trust AI-generated recommendations often perform additional manual verification, increasing administrative workloads rather than reducing them. Similarly, employees who do not understand how decisions regarding benefits or compensation have been reached are more likely to submit complaints, even when the outcomes themselves are objectively correct.

It is important to recognize that explainability alone is not sufficient to establish trust. While transparency enhances understanding of how decisions are made, trust also depends on the existence of robust AI governance mechanisms, including clearly defined accountability structures, opportunities for human intervention, and formal appeals procedures. This distinction is particularly important in HR contexts, where decisions directly affect employees and therefore require not only transparency but also perceived fairness, accountability, and procedural legitimacy.

SOLUTIONS

Proposed Solutions to Challenge 1: High Risk of Automation of Administrative HR Roles

Proactive reskilling represents not only an approach to sustainable human capital development but also a strategically sound organizational investment. Research by the McKinsey Global Institute (2025) suggests that investing in the development of existing employees is often more effective than external hiring, resulting in higher retention rates, faster adaptation, and sustained productivity improvements. In this context, reskilling

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initiatives should extend beyond purely technical training and include competencies such as data literacy, AI usage and management, and strategic HR capabilities.

Furthermore, SHRM (2025) reports that organizations implementing structured change management practices during AI adoption significantly increase the likelihood of successful outcomes. Consequently, workforce development should be viewed as a central component of AI implementation rather than a complementary activity.

At the same time, organizations can preserve a critical human role in key decision-making processes through the adoption of Human-in-the-Loop architectures. Such approaches may include final approval of benefits modifications, resolution of exceptional cases, and communication in situations involving employee disputes or complex benefit decisions. Importantly, Human-in-the-Loop design is not a technical limitation of AI systems but a deliberate managerial choice that enables employees to develop new competencies gradually rather than being abruptly displaced by automation.

Proposed Solutions to Challenge 2: Algorithmic Bias in HR and Benefits Processes

Algorithmic bias auditing should not be regarded as an optional enhancement but as a minimum requirement for responsible AI governance. Organizations should establish systematic fairness assessment procedures for every AI-enabled HR application, including evaluations of potential discrimination across protected demographic characteristics.

The European Union (2024) classifies many HR-related AI systems as high-risk applications and requires the implementation of risk management procedures, data quality controls, and continuous monitoring mechanisms aimed at reducing algorithmic bias. Proactive compliance with these requirements simultaneously reduces regulatory exposure and improves organizational accountability.

Albaroudi et al. (2024) specifically recommend techniques such as vector space correction and data augmentation as effective approaches for mitigating bias in AI-supported recruitment systems. Beyond technical interventions, the quality and diversity of training data remain equally important. Historical datasets that contain systematic distortions or discriminatory patterns should be corrected or supplemented before model development.

Organizations should also provide employees with transparent mechanisms for contesting AI-generated decisions, particularly when such decisions affect performance evaluations, compensation, or benefits allocation. Appeals procedures not only protect employee rights but also generate valuable feedback regarding the quality and fairness of algorithmic outcomes.

Proposed Solutions to Challenge 3: Lack of Trust in AI-Based HR Systems

For AI to be effectively adopted within HR functions, its outputs must be understandable and explainable to end users. Organizations should therefore require HR software vendors to provide meaningful explanations regarding how recommendations are generated and on which factors decisions are based.

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The European Union (2024) identifies transparency, user awareness, and human oversight as key requirements for high-risk AI systems. Even beyond regulatory compliance, insufficient transparency undermines trust and limits the practical value of AI-enabled solutions.

Evidence from organizational practice further suggests that successful AI implementation depends not only on technological readiness but also on effective change management. According to SHRM (2025), organizations that actively involve employees throughout the implementation process and communicate clearly about the objectives, limitations, and expected outcomes of AI adoption achieve higher levels of acceptance and more favorable implementation results.

Gradual expansion of AI autonomy also plays an important role in building trust. Organizations may begin by deploying AI systems as decision-support tools and subsequently extend their autonomy to low-risk processes once users have gained confidence in their performance. This approach allows trust to develop through practical experience rather than requiring employees to accept algorithmic decisions unconditionally from the outset. Table 1 summarizes the key challenges identified in this study, their primary consequences, and the corresponding organizational responses.

Table 1. Key Challenges, Consequences, and Proposed Solutions

Challenge	Consequences	Proposed Solutions
Automation of administrative HR roles	Restructuring of HR teams; disproportionate risk for lower-skilled employees	Proactive reskilling; Human-in-the-Loop architecture
Algorithmic bias	Discriminatory HR outcomes; regulatory penalties; inequality in decision-making	Fairness audits; diversified datasets; appeals mechanisms
Lack of trust in AI systems	Lower return on investment; increased manual verification workload; higher number of employee complaints	Explainable AI; communication strategies; gradual AI autonomy

Source: Developed by the authors

DISCUSSION

When considered together, the three challenges identified in this study reveal a common pattern: they do not arise solely from the technology itself but from the manner in which the technology is implemented and managed. Automation becomes problematic primarily in the absence of adequate reskilling initiatives; algorithmic bias remains a manageable risk when supported by appropriate auditing and governance processes; and distrust can be mitigated through transparency and the gradual accumulation of user experience. What these challenges have in common is the need for deliberate managerial intervention rather than passive adaptation to technological change.

The principle of an augmentation-first approach follows directly from this logic. AI in HR and benefits administration should be designed with a clear objective: to enhance the capabilities of HR professionals rather than replace them. Benefits administration, in particular, requires a personalized understanding of employee

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needs and circumstances. While AI can provide valuable analytical support and recommendations, fully replacing human judgment with algorithmic decision-making may create both technical and regulatory risks.

Korinek and Stiglitz (2019) argue that the long-term impact of AI on employment depends not only on technological capabilities but also on the institutional mechanisms that determine how the economic benefits of automation are distributed across society. This perspective reinforces the argument that the consequences of AI adoption are shaped by organizational and policy choices rather than by technology alone.

The European Union (2024) has translated many of these principles into legally binding requirements. Because AI systems used in employment-related contexts may be classified as high-risk applications, the development of responsible AI infrastructures is no longer merely a matter of best practice but also of regulatory compliance. Consequently, organizations must approach AI implementation not only as a technological initiative but also as a governance challenge.

In the Bulgarian context, where AI adoption in HR systems remains at an early stage, there is a valuable opportunity for proactive preparation. According to Eurostat (2025), approximately 8–9% of Bulgarian enterprises currently use AI technologies, compared with an EU average of around 20% and substantially higher levels in leading countries such as Denmark (Figure 3).

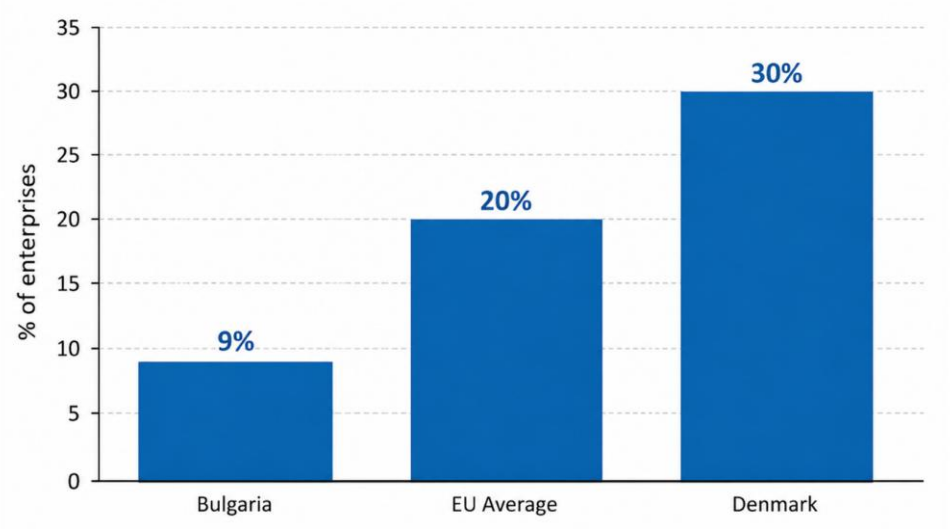

Figure 3. Use of Artificial Intelligence Technologies in Enterprises: Bulgaria, EU Average, and Denmark

Source: Developed by the author based on Eurostat (2025)

Additional evidence from Deloitte (2024) indicates that organizations combining AI adoption with investments in employee training and structured change management achieve higher levels of technology acceptance and more favourable organizational outcomes. At the same time, only around 9% of Bulgarian enterprises provide ICT-related training to their employees, compared with approximately 22% across the European Union (National Statistical Institute, 2023). This suggests that investments in reskilling, algorithmic auditing, and communication strategies are likely to be significantly more effective when implemented proactively rather than introduced reactively after organizational problems have already emerged.

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Overall, the findings suggest that the success of AI implementation in HR software depends less on the sophistication of the technology itself and more on the organizational capabilities developed around it. Responsible governance, workforce development, and human-centered implementation strategies appear to be the key determinants of sustainable and effective AI adoption.

A MODEL FOR MANAGING AI INTEGRATION IN HR SOFTWARE

As a result of the analyses in this article, a model for integrating AI into human resource management software is proposed. This model consists of four levels that allow for analyzing, filtering, and mitigating risks arising from the implementation of AI technologies. The process of integrating artificial intelligence into HR platforms and the subsequent impact on organizational processes, risks, and necessary management decisions is illustrated in Figure 4.

In the upper part of the diagram (Level 1: Inputs), three parallel blue blocks are located, representing the main HR functional areas:

• Workforce Administration: Covers digital records, employee time and attendance tracking.

• Benefits Management: Administration of social packages, health insurance, and personalized bonuses.

• Compensation Processing: Automation of payroll, tax calculations, and financial transfers.

The three streams are united in a central block AI Integration in HR Platforms (Workday, SAP, UKG), which symbolizes the implementation of AI technologies in modern HR systems.

Level 2 is a filter that divides the impact of AI into two streams depending on the nature of the tasks. From the central AI block, the stream passes to a decision-making diamond Task-Based Framework Analysis. This is a filter through which HR tasks are evaluated according to their suitability for automation or support by AI.

Two main directions emerge from the diamond:

• Substitution stream: Aimed at routine, repetitive and purely administrative tasks (e.g. automatic data extraction, chatbots for primary service). Here the risk of displacement of human labor is highest.

• Supplementation stream: Aimed at non-routine, complex and cognitive tasks (e.g. predictive analysis of turnover, optimization of salary budgets). Here AI supports employees by improving analytical abilities and decision-making.

The two directions show different strategies for applying AI in HR – replacing labor or supplementing human capabilities.

Level 3 identifies organizational risks that threaten organizational stability. The flow of automation leads to three red blocks that represent the key organizational risks when implementing AI:

• Risk of layoffs of low-skilled employees due to the automation of routine activities (Displacement Risk): This risk represents a socio-economic pressure on employees at lower administrative levels.

• Algorithmic bias and subjectivism (Algorithmic Bias): This risk represents a danger of discriminatory decisions in the automated evaluation of employees or the distribution of remuneration. This block is directly

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linked to the external regulatory pressure of the EU AI Act, as these systems fall into the "high-risk" category. This act emphasizes the need to comply with European regulations for high-risk AI systems.

• Lack of trust and resistance (Employee Distrust): This risk represents a psychological barrier where managers do not trust AI calculations and perform unnecessary manual double-checks. This level focuses on the social, ethical and regulatory challenges of AI integration.

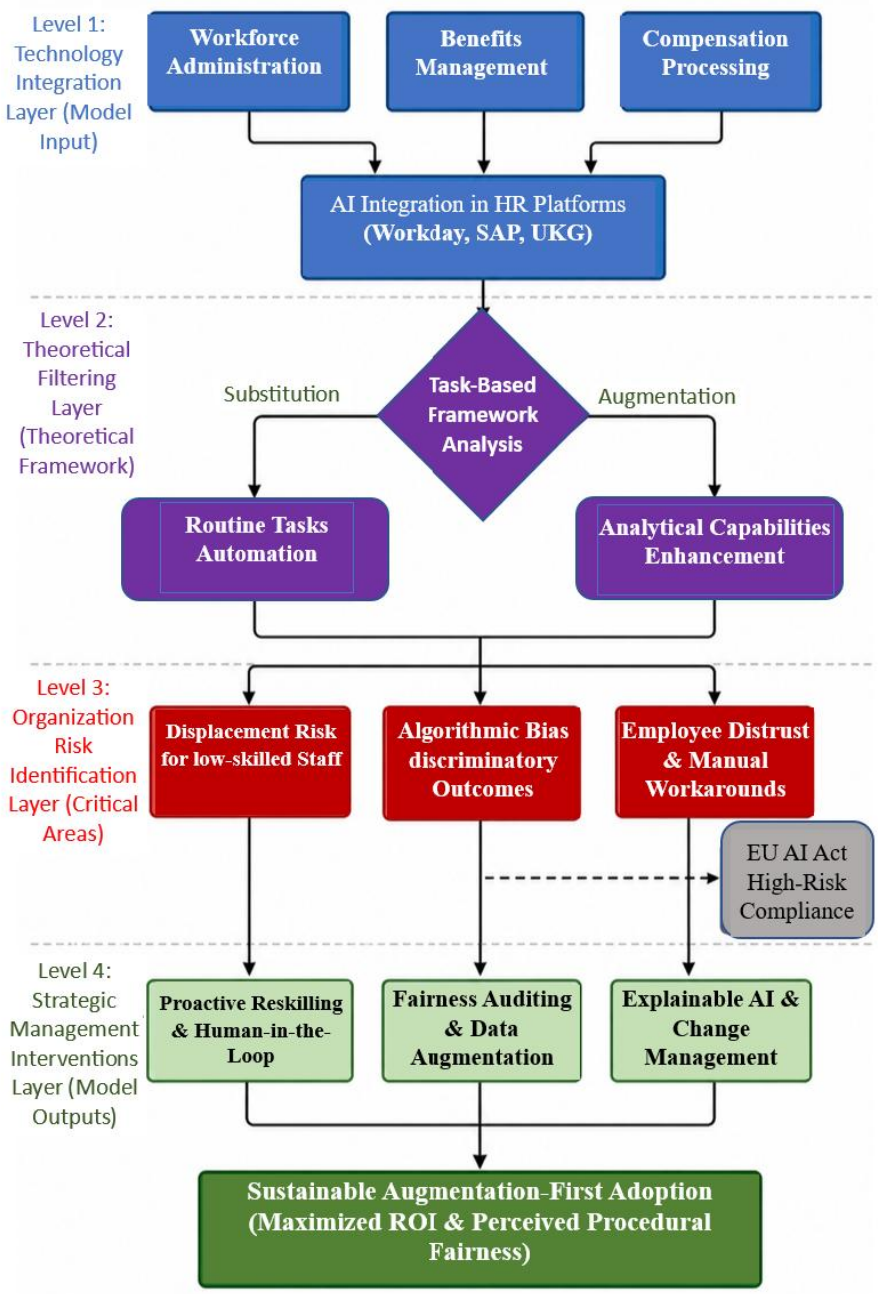

Figure 4. A model for managing the integration of artificial intelligence into human resource management software.

Source: Developed by the authors

Level 4 offers management interventions aimed at neutralizing the risks of Level 3. Several management strategies are proposed in this model. Each risk is associated with a corresponding green block, presenting the recommended management solutions:

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• Proactive Reskilling & Human-in-the-Loop – actively retraining employees and preserving human control in critical processes. Transforming at-risk administrators into supervisors of AI systems, preserving the final word of the human.

• Fairness Auditing & Data Augmentation – auditing for fairness of algorithms and improving the quality and representativeness of data. Regular technical verification of the software is required for the absence of hidden discrimination and balancing of input data sets.

• Explainable AI & Change Management – using explainable AI and effective management of organizational change to build trust among employees. Providing transparency (clarity of how AI calculated a given bonus or salary) to eliminate skepticism among employees.

By closing the chain of strategic decisions, the model leads the organization to its ultimate goal: Sustainable Augmentation-First Adoption. In this state, the maximum return on investment (ROI) in software is achieved, combined with a sense of procedural fairness among employees in the organization. The proposed model shows the logical sequence from the core HR processes through the integration of AI and the choice between automation and assistance to the emerging risks and the necessary organizational measures. The proposed AI implementation model is strongly oriented towards augmentation of human labor (augmentation-first), which simultaneously maximizes the return on investment and maintains a sense of procedural fairness among employees.

CONCLUSION

The dynamic integration of artificial intelligence into modern HR software is no longer a matter of future predictions, but a reality that fundamentally restructures administrative processes, compensation management and benefits packages. This research systematizes the three most critical organizational challenges arising from this transformation: the increased risk of automation and displacement of administrative staff, the manifestation of hidden algorithmic biases, and the systemic lack of trust on the part of employees and managers towards automated solutions.

The main contribution of this paper is the development of a conceptual four-level model for managing AI integration. By breaking down the processes through the task-based theoretical framework, the model successfully filters the activities of two streams – to replace and to supplement – by offering direct, practical managerial interventions to neutralize the identified risks. The introduction of practices such as proactive reskilling, human-in-the-loop architectures, regular fairness audits and the implementation of explainable AI prove that successful technology implementation is primarily a management challenge, not a purely technical one.

In the context of countries like Bulgaria, where the levels of AI implementation in enterprises (8-9%) are still significantly behind the average for the European Union (20%), the proposed model has strategic preventive importance. It enables organizations to build their HR systems proactively rather than reactively – in full compliance with the strict regulatory requirements of the EU AI Act.

In conclusion, an augmentation-first strategy emerges as the only reliable way forward. When organizations invest equally in technology infrastructure, employee development and transparent governance, they not only minimize legal and ethical risks. They achieve higher long-term return on investment (ROI) and build an organizational culture based on procedural fairness and mutual trust.

Future research in this area could focus on empirically testing the proposed four-level model in real software environments in Bulgarian enterprises to quantify its effect on labor productivity and employee technology adoption levels.

Conflict of interests

The authors declare no conflict of interest.

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Declaration of Generative AI and AI-assisted technologies in the writing process: During the preparation of this work the authors not used Generative AI or AI-assisted tools to create or alter images in manuscript.

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References

Acemoglu, D. (2025). The simple macroeconomics of AI. *Economic Policy*, 40(121), 13–58. https://doi.org/10.1093/epolic/eiae042

Acemoglu, D., & Restrepo, P. (2019). Automation and new tasks: How technology displaces and reinstates labor. *Journal of Economic Perspectives*, 33(2), 3–30. DOI: 10.1257/jep.33.2.3

Albaroudi, E., Mansouri, T., & Alameer, A. (2024). A comprehensive review of AI techniques for addressing algorithmic bias in job hiring. AI, 5(1), 383–404. https://doi.org/10.3390/ai5010019

Autor, D. H., Chin, C., Salomons, A., & Seegmiller, B. (2024). New frontiers: The origins and content of new work, 1940–2018. *Quarterly Journal of Economics*, 139(3), 1399–1465. https://doi.org/10.1093/qje/qjae008

Borissova, D., Cvetkova, P., Garvanov, I., & Garvanova, M. (2020A). A framework of business intelligence system for decision making in efficiency management. In: K. Saeed & J. Dvorský (Eds.), Computer Information Systems and Industrial Management. CISIM 2020. Lecture Notes in Computer Science, vol. 12133, pp. 111-121. Springer, Cham, doi: https://doi.org/10.1007/978-3-030-47679-3_10

Borissova, D., Dimitrova, Z., Naidenov, N., Garvanova, M., Garvanov, I., & Blagoev, I. (2024). Digitalization Challenges: A Decision-Making Model for SCADA Systems Staff Selection, WSEAS transactions on business and economics, Volume 21, 2024, pp. 1869-1876, DOI: 10.37394/23207.2024.21.152

Borissova, D., Dimitrova, Z., Yoshinov, R., Garvanova, M., & Garvanov, I. (2025). A multidimensional approach to assessing the progress of IT's success in the process of digitalization. 2025 6th International Conference on Communications, Information, Electronic and Energy Systems (CIEES), Ruse, Bulgaria, 26-28 November, 2025, pp. 1-5. doi: 10.1109/CIEES66347.2025.11300015

Borissova, D., Garvanova, M., Dimitrova, Z., Pandulis, A., & Garvanov, I. (2020B) Decision support framework for composing of different questionnaires based on business model with optimization. In: VN. Huynh, T. Entani, C. Jeenanunta, M. Inuiguchi, & P. Yenradee (Eds.), Integrated Uncertainty in Knowledge Modelling and Decision Making. IUKM 2020. Lecture Notes in Computer Science, vol. 12482, pp. 50-61. Springer, Cham, doi: https://doi.org/10.1007/978-3-030-62509-2_5

Brynjolfsson, E., Li, D., & Raymond, L. (2025). Generative AI at work. *The Quarterly Journal of Economics*, 140(2), 889–942. https://doi.org/10.1093/qje/qjae044

Deloitte. (2024). 2024 Global Human Capital Trends. Deloitte Insights. https://www.deloitte.com/za/en/services/consulting/research/2024-human-capital-trends.html (Accessed on July 4, 2026)

European Union. (2024). Regulation (EU) 2024/1689 laying down harmonised rules on artificial intelligence (Artificial Intelligence Act). Official Journal of the European Union. http://data.europa.eu/eli/reg/2024/1689/oj (Accessed on July 4, 2026)

Eurostat. (2025). Use of artificial intelligence in enterprises. European Commission. Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises (Accessed on July 8, 2026)

Fortune Business Insights. (2026). Human Resource (HR) Technology Market Size, Share & Industry Analysis, By Type (Talent Management, Workforce Management, Recruitment, Payroll Management, Performance Management, and Others), By Deployment (Cloud and On-premise), By Enterprise Type (Small and Medium Sized Enterprises (SMEs) and Large Enterprises), By Industry (BFSI, IT & Telecommunication, Government, Manufacturing, Retail, Healthcare, and Others), and Regional Forecast, 2025-2034 https://www.fortunebusinessinsights.com/human-resource-hr-technology-market-105437 (Accessed on July 4, 2026)

IBM Institute for Business Value. (2024). HR champions generative AI: Embrace experimentation, empower people. IBM Corporation. https://www.ibm.com/thought-leadership/institute-business-value/en-us/report/hr-generative-ai (Accessed on July 8, 2026)

International Labour Organization. (2023). Generative AI and Jobs: A Global Analysis of Potential Effects on Job Quantity and Quality. ILO Working Paper96. https://www.ilo.org/publications/generative-ai-and-jobs-policies-manage-transition (Accessed on July 4, 2026)

Korinek, A., & Stiglitz, J. E. (2019). Artificial intelligence and its implications for income distribution and unemployment. In A. Agrawal, J. Gans, & A. Goldfarb (Eds.), The Economics of Artificial Intelligence: An Agenda (pp. 349–390). University of Chicago Press. https://doi.org/10.7208/chicago/9780226613475.003.0014

McKinsey Global Institute. (2023). The Economic Potential of Generative AI: The Next Productivity Frontier. McKinsey & Company. https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/the-economic-potential-of-generative-ai-the-next-productivity-frontier#/ (Accessed on July 8, 2026)

National Statistical Institute. (2023). ICT Usage and Enterprises. NSI, Bulgaria. https://www.nsi.bg/en/statistical-data/309 (Accessed on July 4, 2026)

OECD. (2023). Artificial Intelligence and the Labour Market. OECD Publishing. https://www.oecd.org/en/publications/oecd-employment-outlook-2023_08785bba-en/full-report/artificial-intelligence-and-the-labour-market-introduction_ea35d1c5.html (Accessed on July 4, 2026)

OECD. (2024). OECD Employment Outlook 2024. OECD Publishing. https://www.oecd.org/en/publications/oecd-employment-outlook-2024_ac8b3538-en.html (Accessed on July 8, 2026)

SHRM. (2025). The Role of AI in HR Continues to Expand. 2025 Talent Trends Series. Society for Human Resource Management. https://verifywise.ai/ai-governance-library/sector-specific-governance/the-role-of-ai-in-hr-continues-to-expand-2025-talent-trends (Accessed on July 8, 2026)

Tairov, I., Stefanova, N., Aleksandrova, A., Aleksandrov, M. (2024). Review of AI-Driven Solutions in Business Value and Operational Efficiency. *Economics Ecology Socium*, *8*, 55-66. DOI: https://doi.org/10.61954/2616-7107/2024.8.3-5

World Economic Forum. (2025). The Future of Jobs Report 2025. World Economic Forum. https://www.weforum.org/publications/the-future-of-jobs-report-2025/ (Accessed on July 4, 2026)

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