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Antecedent–Consequence Model of Artificial Intelligence's Impact on Human Resource Development

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ABSTRACT

Objective: *The purpose of this study is to present a predecessor–successor model explaining the impact of artificial intelligence on human resource development (HRD).* ***Method:*** *The present research is applied in nature and conducted through a qualitative research approach using content analysis. The data collection method was qualitative and carried out through a library-based study, involving the review of books, articles, and theses.* ***Results:*** *The findings indicated that the antecedents influencing the impact of AI on HRD can be classified into several categories. The first group includes technical and data-related factors, such as technological infrastructure and integration, informational and communication factors, information quality, data mining, intelligence requirements, and functional requirements. The second group involves human and organizational factors; the third group includes managerial and process factors; the fourth group covers environmental and industrial factors; and finally, the fifth group comprises legal, ethical, and perceived benefit factors. Additionally, the consequences (successors) of AI implementation in HRD can also be categorized into several main groups: the first group relates to improved performance and productivity; the second group to employee development and advancement; the third group to motivation, satisfaction, and employee experience; the fourth group to innovation and knowledge management; and the fifth group to organizational relationships and structures.* ***Novelty:*** *The study introduces a predecessor–successor model that categorizes the antecedents and consequences of AI's impact on human resource development, distinguishing technical, organizational, managerial, environmental, and ethical factors, and their influence on HRD outcomes such as performance, employee satisfaction, innovation, and organizational structure.*

INTRODUCTION

The artificial intelligence (AI) revolution seeks to replace, enhance and expand upon tasks traditionally performed by humans, making it a formidable competitor to the human workforce. Consequently, AI is well-positioned to support all human resource management functions [1]. Examining the antecedent and consequent factors of AI's impact on human resource development is crucial because, by transforming traditional processes, AI plays a key role in improving employee performance and increasing organisational productivity. Understanding antecedent factors, such as organisational culture, technological infrastructure, employee readiness and management support, helps organisations create the conditions necessary for the successful implementation of AI. Conversely, analysing subsequent factors, such as improving employee skills, promoting organisational learning, changes in job structures, and increasing job satisfaction, can aid in making strategic decisions for human resource management in the digital age. AI not only plays a role in recruitment, training and performance appraisal,

but also influences organisational culture and human interactions. Therefore, examining these factors enables organisations to capitalise on the opportunities offered by AI and manage the challenges it poses. Despite the growing tendency of HR organisations to invest in AI, no research has yet been conducted to provide managers with a comprehensive overview of the dimensions of AI application in the field of human resources. In today's world, where technology is increasingly permeating the fabric of human life, the role of AI in transforming training and development processes is undeniable. One factor necessitating this research is that no academic research has yet been conducted on the impact of AI on the future of jobs. This study aims to examine the level of awareness and uncover the perspectives of specialists and experts in the field of human resources management regarding the deployment of artificial intelligence, and to assist managers by overcoming the uncertainty surrounding the future of professions in the healthcare sector — including hospitals — to develop informed and well-founded strategies so that employees can understand and accept the presence and advancement of technology in their current profession with depth and seriousness, and realise that they must prepare themselves for these circumstances. Against this backdrop, critical analysis and an understanding of the multifaceted concepts of artificial intelligence and the integration of automation into human resource development are of paramount importance. As organisations increasingly rely on technology to achieve operational efficiency, understanding the broader impact of these technologies on human resource development outcomes becomes essential. This is particularly important given that HR professionals are tasked with balancing technological efficiency against ethical considerations and human factors, and an evidence base is crucial for making informed decisions. Therefore, the debate surrounding the role of artificial intelligence and automation in human resource development is not limited to their operational efficiency alone, but also encompasses their potential impacts on social and human development, including issues of equality, job security and skills development. Progress in human resource development in the healthcare sector, and related research, has been extremely slow despite the efforts of scientists and experts. In Iraqi government hospitals, such as Al-Rafidain Hospital and Al-Rashidi Hospital, comprehensive operational advancement requires the integration of artificial intelligence into human resource management processes. AI has had a fundamental impact on learning, training and human resource development methods. The importance of using intelligent systems is not limited to enhancing hospital productivity and efficiency; it can also positively influence staff empowerment and improve personalised learning processes. Personalised learning using AI is an approach that tailors learning experiences to the unique needs and interests of each learner. Through AI, educators and trainers can provide staff with personalised learning pathways, adaptive assessments and effective feedback, leading to more efficient and effective learning. The importance of AI in hospital HR management lies in automating staff shift scheduling and implementing healthcare productivity regulations, using AI and genetic algorithms to optimise calculations and identify shift patterns. Human resources leaders report that hiring talent in the fields of artificial intelligence

and data will be at the top of their technical priorities in 2024, as the AI revolution spreads across workplaces nationwide. Hospitals must take the initiative by recruiting new talent and investing in the upskilling of current staff, in order to build a skilled, knowledgeable and strategic workforce, equipped to navigate an AI-driven world. One of the key benefits of using AI in healthcare human resources planning is the increased accuracy and speed in carrying out various activities. By utilising AI algorithms and models, the recruitment process can be accelerated, staff skills developed, and working conditions improved. Furthermore, AI can automatically collect and analyse information about staff to provide better solutions for identifying their job requirements. In addition, managers can use AI to predict their organisation's future needs and improve their human resources plans. Ultimately, the use of AI in human resources planning within hospitals can lead to increased efficiency, reduced costs and improved quality of patient care. Overall, this innovative technology can contribute significantly to improving the performance of healthcare organisations and raising the standard of healthcare services.

Research Background

Artificial Intelligence

Artificial intelligence is a branch of computer science that aims primarily to create intelligent machines capable of performing tasks that require human intelligence. Artificial intelligence is, in fact, a form of computer simulation of human intelligence; by artificial intelligence, we mean a machine that has been programmed in such a way that it thinks like a human and is capable of imitating human behaviour. This definition can be applied to all machines that operate in a manner similar to the human mind and are capable of performing tasks such as problem-solving and learning [2].

Definition of AI-driven Human Resources

This concept involves the use of artificial intelligence technologies to optimise, automate and enhance human resources tasks, with the aim of creating smarter HR systems that make HR decisions more effectively and accurately, and make HR processes more efficient. This definition raises two key points. Firstly, the success of any AI model in the field of human resources requires deeper integration of these technologies into the organisation's business intelligence systems, thereby facilitating the deployment and use of intelligent applications. Secondly, developing and implementing AI technologies without leveraging the existing business intelligence system can be a resource- and time-intensive process. Ultimately, AI-driven human resources management serves as a tool to improve the efficiency of HR processes, including recruitment and hiring, performance appraisal, and employee training and development, enabling organisations to make HR decisions based on more accurate data and smarter analytics [3].

Human Resource Development

Human resources represent the knowledge possessed by individuals within an organisation. Employees can build intellectual capital through their competence, sound judgement and mental flexibility. A company's human resources consist of skills, expertise, problem-solving abilities and leadership styles. Although employees are considered the most important assets of learning organisations, they are not the property

of the company and are not owned by it [4]. Human resources are the knowledge, experience and capabilities of employees; they represent the collective human capabilities of the organisation to solve business problems, and the organisation cannot own them. When individuals leave the organisation, human resources may also leave [5].

The Benefits of Artificial Intelligence in Human Resource Development

Artificial intelligence can help companies address these issues, for example, by enabling them to tailor career development and training programmes for employees [6]. Both new recruits and long-serving staff often require training and development. AI developers offer solutions that educate individuals about their roles and responsibilities. However, based on an individual's skill set, AI recommends the training necessary for success in the role. Traditionally, before the introduction of AI into human resources management, HR managers would review CVs to identify skills that might need improvement to fill a specific role. This manual process is now being replaced by the use of AI services. AI assesses the skills listed in the applicant's CV, then identifies those that may require further development. Finally, the AI system generates the necessary documents for training and development in those specific skills [7]. Abbasi and Esmaili conducted a study entitled 'Artificial Intelligence and Digital Human Resource Operations: Applications and Challenges' [8]. This was carried out the research was conducted through a review of the theoretical literature and ten semi-structured interviews with experts specialising in digital human resources processes and artificial intelligence technology. Using thematic analysis, AI applications were identified across two dimensions: 'foundational and supportive roles' and nine components: job design, recruitment and selection, performance appraisal, training, employee retention, payroll, process optimisation, decision-making, and disciplinary actions. Furthermore, challenges relating to staff, communication, technology and data, organisational and operational challenges, and information quality were identified and categorised into two groups: 'human challenges' and 'systemic challenges'. Ghorbani and Atifar conducted a study entitled 'A Review of the Application of Artificial Intelligence in Human Resource Training and Development' [9]. This research was conducted using a descriptive-analytical approach and based on previous studies and research. The results showed that AI applications in the field of human resource training and development include content creation, adaptive development programmes, knowledge discovery, skills gap analysis, career path planning, recommendation systems, virtual trainers, assessment and feedback, and gamification. Gholami conducted a study entitled 'The Impact of AI Adoption on Human Resource Management Functions'[10]. This research was conducted using a stratified random sampling method among human resource managers and specialists at Ryan Gostar Hama companies in Tehran. The results showed that AI technology has a significant impact on selection and recruitment, training and development, performance appraisal, employee engagement, and rewards and benefits in human resource management. Hosseini conducted a study entitled 'The Role of Artificial Intelligence in Human Resource Management in the Sports Industry' [11]. This research was conducted using a qualitative method and semi-structured interviews with

12 individuals, including sports management professors, sports club managers, and directors and managers of sports and youth affairs offices in West Azerbaijan Province. The data were analysed using the Clasey method and open and axial coding. The results revealed 28 main themes divided into two sections regarding the effects of artificial intelligence on human resource management, including: 1- market analysis, 2- diversity management, 3- employee satisfaction, 4- attendance data analysis, 5- Process automation, 6- Forecasting human resource needs, 7- Improving time management, 8- Reducing discrimination, 9- Burnout, 10- Enhancing the employee experience, 11- Fan engagement, 12- Performance management, 13- Employee development and training, 14- Improving recruitment and selection. Factors influencing the use of artificial intelligence in human resources management include the following: 1- Laws and regulations, 2- The ability to analyse and interpret organisational results, 3- Skills training and development, 4- Change management, 5- The specific needs of the sports industry, 6- Organisational acceptance, 7- Implementation and maintenance costs, 8- Collaboration between technology and human resource management, 9- Skills and training gaps, 10- Adoption and acceptance by human resource professionals, 11- Transparency and trust, 12- Ethical considerations and bias, 13- Technological infrastructure and integration, and 14- Data quality and accessibility. Ultimately, it can be said that managers' familiarity with the use of artificial intelligence, adherence to ethics, and staff training lead to organisational productivity and effectiveness. Nick Fargam conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on Human Resource Management Indicators'. This research was conducted using a convenience sampling method among employees of the Chenaran Education and Training Organisation [12]. The results showed that AI has an impact on human resource management. Technological awareness, the influence of social media, and personal innovation affect the impact of AI on human resource management, whilst perceived risks mitigate the impact of technological awareness on human resource management. Salehi Sadeh conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on the Individual and Organisational Dimensions of Human Resource Management' [13]. This study was conducted using a convenience sampling method among employees of the Baharestan Municipality. The results showed that artificial intelligence It has a significant impact on the individual and organisational dimensions of human resource management amongst employees. Furthermore, artificial intelligence influences the individual dimensions of recruitment, selection, training and job performance, as well as the organisational dimensions of customer satisfaction, decision-making, innovation and organisational performance. Akbari and Tahmasibi conducted a study entitled 'Identifying Applications and Requirements of Artificial Intelligence in the Recruitment and Hiring Process' [14]. This research was conducted qualitatively using a case study strategy. Interviews were used to collect information, and thematic analysis was employed to analyse the data. The results showed that the applications and requirements identified for the deployment of AI in the field of recruitment and hiring include key areas of application, technical requirements, intelligence requirements, functional requirements, ethical requirements,

malfunctions, and non-structural factors. Borshabi conducted a study entitled 'Employee Training Using Artificial Intelligence (A Systemic Model Presentation)'. This research was conducted using both qualitative and quantitative methods. The statistical sample in the qualitative section comprised experts familiar with the subject, 20 of whom were selected using the sequential sampling method. The statistical sample for the quantitative part consisted of all specialists and experts, who were selected using simple random sampling. The results showed that the model inputs include training data, personal information, training requirements, user feedback, and workplace data. The model's processes also include requirement and objective identification, data collection, data pre-processing, AI model training, model evaluation and improvement, implementation and deployment, and monitoring and updating. Finally, the model's outputs include individual feedback, training recommendations, monitoring and follow-up, and support and guidance. Eslami and Khodiari conducted a study entitled 'Identifying Applications, Opportunities, and Challenges for the Use of Blockchain Technology in Human Resource Management' [15]. This study was qualitative, applied and descriptive in nature. The statistical sample consisted of published articles relating to blockchain technology in human resource management, which were searched for in three scientific databases: Scopus (Elsevier), Web of Science, and Google Scholar. The results were described in three sections separate sections titled 'Applications', 'Opportunities' and 'Challenges Facing Blockchain Technology in Human Resource Management'. Based on the findings, blockchain technology is most applicable to recruitment-related processes and offers opportunities such as fraud prevention, secure record-keeping and cost reduction. Saeed Naghavi et al. conducted a study titled "A Data Science and Machine Learning-Based Human Resource Management Intelligence Model"[16]. In the qualitative section, thematic analysis was used, and in the quantitative section, text mining was employed. In the qualitative section, 248 articles were extracted, and 78 articles were selected and coded to answer the research questions. In the quantitative section, text mining analysis methods were also applied using the Python language. Based on the final model, organisational managers and experts will be able to take measures to intelligently automate systems and software solutions to improve the quality of data-driven decision-making in the field of human resources. Sarvestani and Piranzadeh conducted a study entitled 'The Application and Benefits of Artificial Intelligence in Human Resource Management' [17]. This qualitative research was conducted using a literature-based method, in which 33 English-language articles from 2017 were reviewed, drawn from the Web of Science, Google Scholar and SAGE databases. In reviewing the articles, keywords such as artificial intelligence, human resources, digital human resources, and the benefits of artificial intelligence in human resources were used. The results showed that AI can lead to time and cost savings in HR processes. AI has the potential to be used in all HR processes. Currently, the most common uses of AI are in the recruitment process, CV screening, chatbots, and conducting interviews. Satarai and colleagues conducted a study entitled 'The Application of Artificial Intelligence in Human Resource Management'. This research was conducted using a desk-based research method in the field of urban

construction and collective housing. The results showed that there is a growing trend towards the use of AI systems in human resource management functions, with the aim of improving workforce productivity, increasing efficiency, enhancing decision-making, and creating a sustainable competitive advantage for organisations.

Abbasi and Ismaili conducted a study entitled 'Artificial Intelligence and Digital Human Resources Operations: Applications and Challenges' [8]. This research was carried out through a review of the theoretical literature and the use of ten semi-structured interviews with experts specialising in digital human resources operations and artificial intelligence technology. Using thematic analysis, AI applications were identified across two dimensions: "foundational and supportive roles" and nine components: job design, recruitment and selection, performance appraisal, training, employee retention, payroll, process optimisation, decision-making, and disciplinary actions. Furthermore, challenges relating to staff, communication, technology and data, organisational and operational challenges, and information quality were identified and categorised into two groups: 'human challenges' and 'systemic challenges'. Ghorbani and Atifar conducted a study entitled 'A Review of the Application of Artificial Intelligence in Human Resource Training and Development' [9]. This research was conducted using a descriptive-analytical approach and based on previous studies and research. The results showed that AI applications in the field of human resource training and development include content creation, adaptive development programmes, knowledge discovery, skills gap analysis, career path planning, recommendation systems, virtual trainers, assessment and feedback, and gamification. Gholami conducted a study entitled 'The Impact of AI Adoption on Human Resource Management Functions' [10]. This research was conducted using a stratified random sampling method among human resource managers and specialists at Ryan Gostar Hama companies in Tehran. The results showed that AI technology has a significant impact on selection and recruitment, training and development, performance appraisal, employee engagement, and rewards and benefits in human resource management. Hosseini conducted a study entitled 'The Role of Artificial Intelligence in Human Resource Management in the Sports Industry' [11]. This research was conducted using a qualitative method and semi-structured interviews with 12 individuals, including sports management professors, sports club managers, and directors and managers of sports and youth affairs offices in West Azerbaijan Province. The data were analysed using the Clasey method and open and axial coding. The results revealed 28 main themes divided into two sections regarding the effects of artificial intelligence on human resource management, including: 1- market analysis, 2- diversity management, 3- employee satisfaction, 4- attendance data analysis, 5- Process automation, 6- Forecasting human resource needs, 7- Improving time management, 8- Reducing discrimination, 9- Burnout, 10- Enhancing the employee experience, 11- Fan engagement, 12- Performance management, 13- Employee development and training, 14- Improving recruitment and selection. Factors influencing the use of artificial intelligence in human resources management include the following: 1- Laws and regulations, 2- The ability to analyse and interpret organisational results, 3- Skills training and development,

4- Change management, 5- The specific needs of the sports industry, 6- Organisational acceptance, 7- Implementation and maintenance costs, 8- Collaboration between technology and human resource management, 9- Skills and training gaps, 10- Adoption and acceptance by human resource professionals, 11- Transparency and trust, 12- Ethical considerations and bias, 13- Technological infrastructure and integration, and 14- Data quality and accessibility. Ultimately, it can be said that managers' familiarity with the use of artificial intelligence, adherence to ethics, and staff training lead to organisational productivity and effectiveness. Nick Fargam conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on Human Resource Management Indicators' [12]. This research was conducted using a convenience sample method among employees of the Chenaran Education and Training Organisation. The results showed that AI has an impact on human resource management. Technological awareness, the influence of social media, and personal innovation affect the impact of AI on human resource management, whilst perceived risks mitigate the impact of technological awareness on human resource management. Salehi Sadeh conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on the Individual and Organisational Dimensions of Human Resource Management' [13]. This study was conducted using a convenience sampling method among employees of the Baharestan Municipality. The results showed that artificial intelligence has a significant impact on the individual and organisational dimensions of human resource management among employees.

Furthermore, artificial intelligence influences the individual dimensions of recruitment, selection, training and job performance, as well as the organisational dimensions of customer satisfaction, decision-making, innovation and organisational performance.

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evaluation and improvement, implementation and deployment, and monitoring and updating. Finally, the model's outputs include individual feedback, training recommendations, monitoring and follow-up, and support and guidance. Eslami and Khodiari (2021) conducted a study entitled 'Identifying Applications, Opportunities, and Challenges for the Use of Blockchain Technology in Human Resource Management'. This study was qualitative, applied and descriptive in nature. The statistical sample consisted of published articles relating to blockchain technology in human resource management, which were searched for in three scientific databases: Scopus (Elsevier), Web of Science, and Google Scholar. The results were described in three separate sections entitled "Applications", "Opportunities" and "Challenges Facing Blockchain Technology in Human Resource Management". Based on the results, blockchain technology is most applicable to recruitment-related processes and offers opportunities such as fraud prevention, secure record-keeping and cost reduction. Saeed Naghavi et al. conducted a study titled "A Data Science and Machine Learning-Based Human Resource Management Intelligence Model" [16]. In the qualitative section, thematic analysis was used, and in the quantitative section, text mining was employed. In the qualitative section, 248 articles were extracted, and 78 articles were selected and coded to answer the research questions. In the quantitative section, text mining analysis methods were also applied using the Python language. Based on the final model, organisational managers and experts will be able to take steps to intelligently automate systems and software solutions to improve the quality of data-driven decision-making in the field of human resources. Sarvestani and Piranzadeh conducted a study entitled 'The Application and Benefits of Artificial Intelligence in Human Resource Management' [17]. This qualitative research was conducted using a literature-based method, in which 33 English-language articles from 2017 were reviewed, drawn from the Web of Science, Google Scholar and SAG databases. In reviewing the articles, keywords such as artificial intelligence, human resources, digital human resources, and the benefits of artificial intelligence in human resources were used. The results showed that AI can lead to time and cost savings in HR processes. AI has the potential to be used in all HR processes. Currently, the most common uses of AI are in recruitment, CV screening, chatbots, and conducting interviews. Satarai and colleagues conducted a study entitled 'The Application of Artificial Intelligence in Human Resource Management' [18]. This research was conducted using a desk-based research method in the field of urban construction and collective housing. The results showed that there is a growing trend towards the use of AI systems in human resource management functions, with the aim of improving workforce productivity, increasing efficiency, enhancing decision-making, and creating a sustainable competitive advantage for organisations. Dima et al. (2024) conducted a study entitled 'The Impact of Artificial Intelligence on Human Resource Activities and the Roles of the Human Resource Triangle: Opportunities and Challenges'. This study was conducted using a qualitative methodology, involving an exploratory review to collect and analyse scientific literature related to the field of artificial intelligence. The study examined 27 years of research and reviewed 43 articles. Based on the findings, the

proposed framework identifies five key impacts of AI on HR activities: task automation, optimised use of HR data, enhancement of human capabilities, redesign of the work environment, and transformation of social aspects and relationships in the workplace. Laviosa et al. conducted a study entitled 'Human Resource Development and Artificial Intelligence from a Personal Development Perspective' [1]. This qualitative research, which utilised two types of bibliometric analysis, was conducted on a total of 151 publications released between 2002 and 2022. The benefits of AI in human resource development include machine learning, natural language processing, fuzzy neural networks, recruitment, productivity, competencies, knowledge management, knowledge workers, lifelong learning, process automation, and social networks. Ghusal et al. conducted a study entitled 'An investigation into predictors of AI adoption for effective human resource management processes'.[19] This research was conducted using simple random sampling amongst human resource staff in pharmaceutical companies across India. The results showed that factors such as organisational readiness, individuals' perception of benefits, and the influence of technological readiness on AI adoption are among the factors affecting AI adoption. Consequently, human resources systems may become more efficient. Shahzad et al. conducted a study entitled 'An Examination of the Impact of Artificial Intelligence on Human Resources Functions in the Healthcare Sector in China: A Moderated Mediation Model' [20]. This study was conducted using a convenience sampling method, with 363 questionnaires distributed to human resources staff in the healthcare sector in China. The results showed that artificial intelligence influences human resources performance through technological awareness, the influence of social media, and personal innovation. Furthermore, perceived risks mitigate the relationship between technological awareness and human resource performance. Kramarenko et al conducted a study entitled 'The Impact of Artificial Intelligence on Employees' Skills and Well-being in Global Labour Markets' [21]. This research was conducted using a systematic literature review method. Initially, 639 academic articles published between March 2020 and March 2023 (the end of the COVID-19 pandemic according to the World Health Organisation) were selected from the Scopus and Web of Science databases. Of these articles, 103 focusing on the professional dimension were retained, whilst 35 focused on the personal component. The results showed that the use of artificial intelligence affects employees' skills and well-being. Chadha et al. conducted a study entitled 'Unlocking the Value of AI in Human Resource Management through an AI Capabilities Framework'. This research was conducted using a systematic literature review method. The findings indicated that organisations must think beyond technical resources and focus on developing non-technical resources such as human skills and competencies, leadership, coordination among team members, organisational culture and an innovative mindset, governance strategy, and, most importantly, the integration of AI and employees. AI also influenced career planning, job characteristics, job autonomy, trust and security, psychological outcomes, motivation and job satisfaction, employee development and progression, team structures, creative intelligence, and innovative thinking. Zain et al conducted a study entitled 'The Implementation of

Artificial Intelligence in Human Resources and Organisational Performance in Malaysia'. This research was conducted using a simple random sampling method among employees of Malaysian government organisations. The results showed that the implementation of AI in talent acquisition, human capital development, and performance management has an impact on organisational performance. Abbasi and Ismaili conducted a study entitled 'Artificial Intelligence and Digital Human Resources Operations: Applications and Challenges' [8]. This research was carried out through a review of the theoretical literature and the use of ten semi-structured interviews with experts specialising in digital human resources operations and artificial intelligence technology. Using thematic analysis, AI applications were identified across two dimensions: "foundational and supportive roles" and nine components: job design, recruitment and selection, performance appraisal, training, employee retention, payroll, process optimisation, decision-making, and disciplinary actions. Furthermore, challenges relating to staff, communication, technology and data, organisational and operational challenges, and information quality were identified and categorised into two groups: 'human challenges' and 'systemic challenges'. Ghorbani and Atifar conducted a study entitled 'A Review of the Application of Artificial Intelligence in Human Resource Training and Development' [9]. This research was conducted using a descriptive-analytical approach and based on previous studies and research. The results showed that AI applications in the field of human resource training and development include content creation, adaptive development programmes, knowledge discovery, skills gap analysis, career path planning, recommendation systems, virtual trainers, assessment and feedback, and gamification. Gholami conducted a study entitled 'The Impact of AI Adoption on Human Resource Management Functions' [10]. This research was conducted using a stratified random sampling method among human resource managers and specialists at Ryan Gostar Hama companies in Tehran. The results showed that AI technology has a significant impact on selection and recruitment, training and development, performance appraisal, employee engagement, and rewards and benefits in human resource management. Hosseini conducted a study entitled 'The Role of Artificial Intelligence in Human Resource Management in the Sports Industry' [11]. This research was conducted using a qualitative method and semi-structured interviews with 12 individuals, including sports management professors, sports club managers, and directors and managers of sports and youth affairs offices in West Azerbaijan Province. The data were analysed using the Clasey method and open and axial coding. The results revealed 28 main themes divided into two sections regarding the impacts of AI on human resource management, including: 1- market analysis, 2- diversity management, 3- employee satisfaction, 4- attendance data analysis, 5- Process automation, 6- Forecasting human resource needs, 7- Improving time management, 8- Reducing discrimination, 9- Burnout, 10- Enhancing the employee experience, 11- Fan engagement, 12- Performance management, 13- Employee development and training, 14- Improving recruitment and selection. Factors influencing the use of artificial intelligence in human resources management include the following: 1- Laws and regulations, 2- The ability to analyse and interpret organisational results, 3-

Skills training and development, 4- Change management, 5- The specific needs of the sports industry, 6- Organisational acceptance, 7- Implementation and maintenance costs, 8- Collaboration between technology and human resource management, 9- Skills and training gaps, 10- Adoption and acceptance by human resource professionals, 11- Transparency and trust, 12- Ethical considerations and bias, 13- Technological infrastructure and integration, and 14- Data quality and accessibility. Ultimately, it can be said that managers' familiarity with the use of artificial intelligence, adherence to ethics, and staff training lead to organisational productivity and effectiveness. Nick Fargam conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on Human Resource Management Indicators' [12]. This research was carried out using a convenience sample of employees at the Chenaran Education and Training Organisation. The results showed that artificial intelligence has an impact on human resource management. Technological awareness, the influence of social media, and personal innovation affect the impact of artificial intelligence on human resource management, whilst perceived risks mitigate the impact of technological awareness on human resource management. Salehi Sadeh conducted a study entitled 'An Investigation into the Impact of Artificial Intelligence on the Individual and Organisational Dimensions of Human Resource Management' [13]. This study was conducted using a convenience sampling method among employees of the Baharestan Municipality. The results showed that AI has a significant impact on the individual and organisational dimensions of human resource management among employees. Furthermore, AI influences the individual dimensions of recruitment, selection, training and job performance, as well as the organisational dimensions of customer satisfaction, decision-making, innovation and organisational performance.

Akbari and Tahmasibi conducted a study entitled 'Identifying Applications and Requirements of Artificial Intelligence in the Recruitment and Hiring Process' [14]. This research was conducted qualitatively using a case study approach. Interviews were used to collect information, and thematic analysis was employed to analyse the data. The results showed that the applications and requirements identified for the deployment of AI in the field of recruitment and hiring include key areas of application, technical requirements, intelligence requirements, functional requirements, ethical requirements, malfunctions, and non-structural factors. Borshabi conducted a study entitled 'Employee Training Using Artificial Intelligence (A Systemic Model Presentation)'. This research was conducted using both qualitative and quantitative methods. The statistical sample in the qualitative section comprised experts familiar with the subject, 20 of whom were selected using the sequential sampling method. The statistical sample for the quantitative part consisted of all specialists and experts, who were selected using simple random sampling. The results showed that the model inputs include training data, personal information, training requirements, user feedback, and workplace data. The model's processes also include requirement and objective identification, data collection, data pre-processing, AI model training, model evaluation and improvement, implementation and deployment, and monitoring and updating. Finally, the model's outputs include

individual feedback, training recommendations, monitoring and follow-up, and support and guidance. Eslami and Khodiari conducted a study entitled 'Identifying Applications, Opportunities, and Challenges for the Use of Blockchain Technology in Human Resource Management'. This study was qualitative, applied and descriptive in nature [15]. The statistical sample consisted of published articles relating to blockchain technology in human resource management, which were searched for in three scientific databases: Scopus (Elsevier), Web of Science, and Google Scholar. The results were described in three separate sections entitled "Applications", "Opportunities" and "Challenges Facing Blockchain Technology in Human Resource Management". Based on the results, blockchain technology is most applicable to recruitment-related processes and offers opportunities such as fraud prevention, secure record-keeping and cost reduction. Saeed Naghavi et al. conducted a study titled "A Data Science and Machine Learning-Based Human Resource Management Intelligence Model"[16]. In the qualitative section, thematic analysis was used, and in the quantitative section, text mining was employed. In the qualitative section, 248 articles were extracted, and 78 articles were selected and coded to answer the research questions. In the quantitative section, text mining analysis methods were also applied using the Python language. Based on the final model, organisational managers and experts will be able to take measures to intelligently automate systems and software solutions to improve the quality of data-driven decision-making in the field of human resources. Sarvestani and Piranzadeh conducted a study entitled 'The Application and Benefits of Artificial Intelligence in Human Resource Management' [17]. This qualitative research was conducted using a literature-based method, in which 33 English-language articles from 2017 were reviewed, drawn from the Web of Science, Google Scholar and SAGE databases. In reviewing the articles, keywords such as artificial intelligence, human resources, digital human resources, and the benefits of artificial intelligence in human resources were used. The results showed that AI can lead to time and cost savings in HR processes. AI has the potential to be used in all HR processes. Currently, the most common uses of AI are in the recruitment process, CV screening, chatbots, and conducting interviews. Satarai and colleagues conducted a study entitled 'The Application of Artificial Intelligence in Human Resource Management'. This research was conducted using a desk-based research method in the field of urban construction and collective housing. The results showed that there is a growing trend towards the use of AI systems in human resource management functions, with the aim of improving workforce productivity, increasing efficiency, enhancing decision-making, and creating a sustainable competitive advantage for organisations. Dima et al. conducted a study entitled 'The Impact of Artificial Intelligence on Human Resource Activities and the Roles of the Human Resource Triangle: Opportunities and Challenges' [4]. This study was conducted using a qualitative methodology, involving an exploratory review to collect and analyse scientific literature related to the field of artificial intelligence. The study examined 27 years of research and reviewed 43 articles. Based on the findings, the proposed framework identifies five key impacts of AI on HR activities: task automation, optimised use of HR data, enhancement of human capabilities, redesign

of the work environment, and transformation of social aspects and relationships in the workplace. Laviosa et al. conducted a study entitled 'Human Resource Development and Artificial Intelligence from a Personal Development Perspective' [1]. This qualitative research, which utilised two types of bibliometric analysis, was conducted on a total of 151 publications released between 2002 and 2022. The benefits of AI in human resource development include machine learning, natural language processing, fuzzy neural networks, recruitment, productivity, competencies, knowledge management, knowledge workers, lifelong learning, process automation, and social networks. Ghusal et al. conducted a study entitled 'An investigation into predictors of AI adoption for effective human resource management processes'. This research was conducted using simple random sampling amongst human resource staff in pharmaceutical companies across India. The results showed that factors such as organisational readiness, individuals' perception of benefits, and the influence of technological readiness on AI adoption are among the factors affecting AI adoption. Consequently, HR systems may become more efficient. Shahzad et al. conducted a study entitled 'A Study on the Impact of Artificial Intelligence on Human Resource Functions in the Healthcare Sector in China: A Moderated Mediation Model' [20]. This study was conducted using a convenience sampling method, with 363 questionnaires distributed to human resources staff in the healthcare sector in China. The results showed that AI influences human resources performance through technological awareness, the influence of social media, and personal innovation. Furthermore, perceived risks mitigate the relationship between technological awareness and human resource performance. Kramarenko et al conducted a study entitled 'The Impact of Artificial Intelligence on Employees' Skills and Well-being in Global Labour Markets' [21]. This research was conducted using a systematic literature review method. Initially, 639 academic articles published between March 2020 and March 2023 (the end of the COVID-19 pandemic according to the World Health Organisation) were selected from the Scopus and Web of Science databases. Of these articles, 103 focusing on the professional dimension were retained, whilst 35 focused on the personal component. The results showed that the use of artificial intelligence affects employees' skills and well-being. Chadha et al. conducted a study entitled 'Unlocking the Value of AI in Human Resource Management through an AI Capabilities Framework'. This research was conducted using a systematic literature review method. The findings indicated that organisations must think beyond technical resources and focus on developing non-technical resources such as human skills and competencies, leadership, coordination among team members, organisational culture and an innovative mindset, governance strategy, and, most importantly, the integration of AI and employees. AI also influenced career planning, job characteristics, job autonomy, trust and security, psychological outcomes, motivation and job satisfaction, employee development and progression, team structures, creative intelligence, and innovative thinking. Zain et al. conducted a study entitled 'The Implementation of Artificial Intelligence in Human Resources and Organisational Performance in Malaysia' [22]. This research was conducted using a simple random sampling method among employees of Malaysian

government organisations. The results showed that the implementation of AI in talent acquisition, human capital development, and performance management has an impact on organisational performance.

RESEARCH METHOD

This study is developmental in its objective, descriptive in nature, and qualitative in terms of the type of data used. Following the identification and clarification of the main topic, the research problem was formulated and contextualised through a review of the literature and theoretical foundations, comparative studies, and an examination of the local and international background of the research. In this study, qualitative, latent, and inductive content analysis was employed, and the antecedent and consequent factors influencing the impact of artificial intelligence on human resource development were identified. This research is developmental in its objective, descriptive in its nature, and qualitative in the type of data used. In this study, after defining and clarifying the main topic, the research problem was formulated and framed through a review of the literature and theoretical foundations, comparative studies, and an examination of local and international contexts. The statistical sample consisted of previous studies, and scientific texts were collected via reputable databases such as Scopus, Web of Science, SID and Magiran. Qualitative content analysis was employed using an immanent and inductive approach to analyse the data, whereby concepts and codes were first extracted, followed by the classification of antecedent and consequent factors influencing the impact of artificial intelligence on human resource development. To ensure validity and reliability, the results of the analyses were verified through expert review and comparison with similar sources. The qualitative research method enabled the identification of influencing factors and interactive patterns at the organisational level.

RESULTS AND DISCUSSION

Results

A total of 24 antecedent factors and 24 consequent factors were identified through a review of the research literature and relevant sources on the impact of artificial intelligence on human resource development, and these were categorised as shown in Figures 1 and 2.

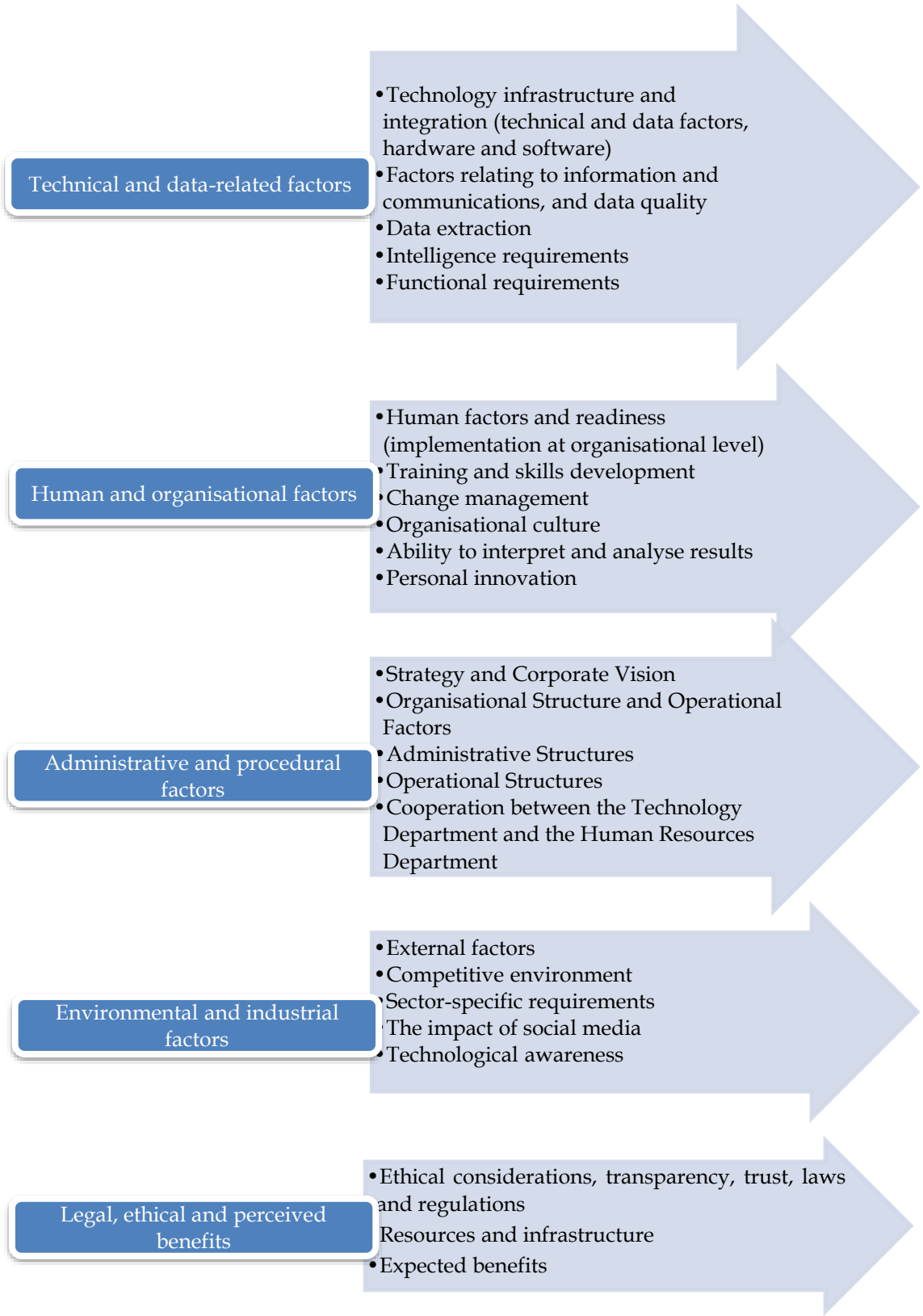

Figure 1. Classification scheme for risk factors.

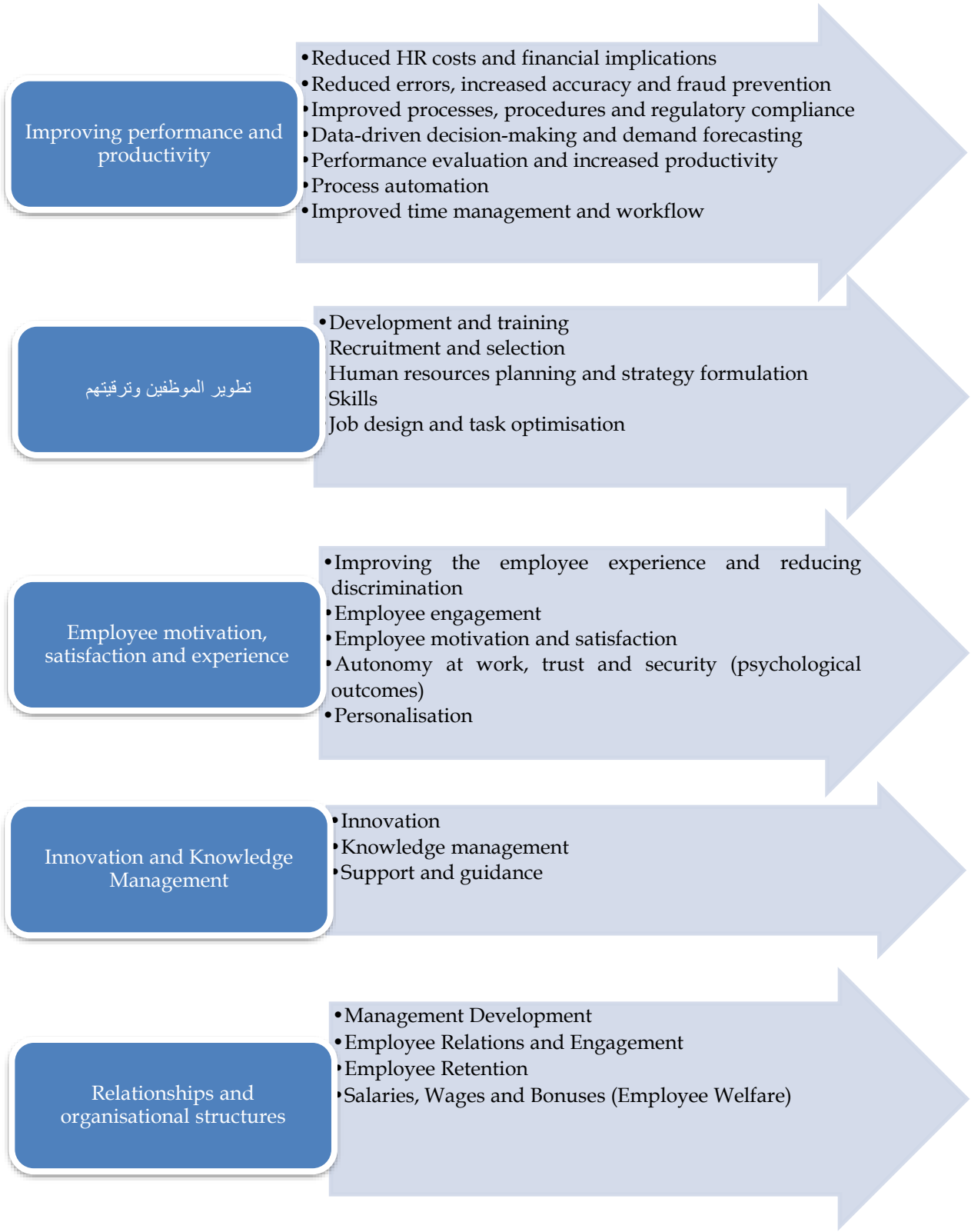

Figure 2, Factor pattern following analysis

Discussion

The first research question is as follows: What is the pattern of antecedent and consequent factors influencing the impact of artificial intelligence on human resource development in Iraqi public hospitals?

The first dimension of the antecedent factors is infrastructure and technology integration, which encompasses technical and data-related factors, as well as hardware and software factors. This finding is consistent with research conducted by Yazdani and Hakimnia, Abasi and Esmaili, Hosseini, Akbari and Tahmisi, Sarfistani, and Yu et al. [8], [11], [14], [23]. The presence of this dimension suggests that the successful implementation of AI in human resource development requires the establishment of an integrated technical, data and technological infrastructure. This means that without the provision of appropriate infrastructure, including stable communication networks, integrated information systems, advanced analytical software, capable hardware, and access to high-quality, integrated data, it will not be possible to make effective use of AI capabilities. This finding underscores that organisations, particularly in the hospital sector, must first work to improve their technological infrastructure and strengthen data standardisation and integration mechanisms to provide a suitable foundation for the deployment and development of AI technologies. This conclusion is consistent with previous research, which has also highlighted the pivotal role of technology and integrated data in the success of digital transformation programmes and the improvement of human resource performance.

The second dimension is the informational, communicational and information quality dimension, which is consistent with the findings of Yazdani and Hakimnia, Abbasi and Esmaili, Hosseini, and Nikfarjam [8], [11], [12]. The presence of this dimension indicates that transparent, accurate and reliable information, alongside effective organisational communication, is a prerequisite for the successful implementation of AI in human resource development. This dimension underscores the importance of having accurate, timely and standardised data, as well as effective communication channels between organisational units and stakeholders. When data is of high quality and communication flows smoothly and transparently, AI can provide more accurate analyses, more informed decision-making, and more effective human resource planning. The findings, which are consistent with previous research, also indicate that high-quality information and appropriate communication interactions lead to fewer errors, increased organisational trust, and facilitate data-driven decision-making.

The other dimension mentioned above is data mining, a finding consistent with the research by Theoret and Zakari-pour [23]. The presence of this dimension suggests that data mining, as a key tool for extracting hidden patterns, relationships and behavioural trends among employees and organisational processes, plays a fundamental role in the success of AI in human resource development. This dimension suggests that the more efficient organisations are at collecting, processing and analysing human resource data, the greater the accuracy of predictions, data-driven decision-making and the optimal allocation of resources. Furthermore, data mining helps identify underlying

needs and opportunities to improve performance and reduce human error, paving the way for the development of smarter and more personalised human resources policies.

The other dimension is intelligence requirements, a finding consistent with the theoretical research conducted by Zakari-Bour and Akbari and Tahmasibi [14], [23]. The presence of the intelligence requirements dimension suggests that, in order to use AI effectively in human resource development, organisations need to establish intelligent platforms comprising learning algorithms, advanced analytics systems, automated processing capabilities, and intelligent decision-making. This dimension suggests that without the provision of intelligent infrastructure, even if data and technologies are available, it will not be possible to fully utilise the potential of AI. The requirements for AI include the creation of organisational learning systems, the development of predictive models, the implementation of optimisation algorithms, and the automated analysis of processes, which can lead to increased accuracy in managerial decisions, improved productivity, and the sustainable development of human capital.

Functional requirements are another dimension; this finding is consistent with the research by Akbari and Tahmasibi [14] The presence of the functional requirements dimension indicates that, for the effective implementation of AI in human resource development, processes, standards and performance indicators must be designed and implemented in a specific manner consistent with organisational objectives. These requirements include defining roles and responsibilities, establishing transparent workflows, and developing precise performance evaluation systems and effective monitoring mechanisms. This approach ensures that the use of AI technologies leads not only to improved processes but also to enhanced productivity and organisational accountability.

The other dimension is the human factor and readiness (organisational acceptance), which is consistent with the studies by Yazdani and Hakimnia, Hosseini, Sarvestani, Agrawal, Yu et al, and Ghosh et al [11], [17]. The presence of this dimension indicates that organisational acceptance and human resource readiness play a key role in the successful implementation of AI in the field of human resource development. This readiness includes employees' ability to adapt to new technologies, a positive attitude towards technological changes, continuous skills development, and senior management's support for digital transformation processes. When employees and managers have a positive attitude towards the adoption of AI and the organisation's resistance to change is reduced, the implementation process will be smoother and human resource productivity will increase.

The seventh dimension is training and skills development, which was also highlighted in the research conducted by Hosseini and Nazari Pour and Zakiri [11], [23]. The presence of this dimension indicates that enhancing employees' knowledge, skills and competencies plays a vital role in the effective use of AI technologies in human resource development. Continuous training and skills development programmes enable employees to work with new tools, analyse data and utilise AI-based outcomes.

Furthermore, this reduces resistance to technological change and boosts employees' confidence and enthusiasm during the digital transformation process.

The eighth dimension is change management. This dimension was also confirmed in the research conducted by Hosseini [11]. The presence of this dimension indicates that an organisation's ability to manage change and adapt to new technologies, particularly artificial intelligence, plays a key role in the success of human resource development. Change management involves careful planning of operational transitions, fostering a new culture, supporting employees, and minimising resistance to technological innovations. This dimension ensures that AI is implemented with minimal disruption to the organisation's operations and with maximum efficiency. The other dimension is organisational culture. This finding is consistent with research conducted by Radarpur, Abasi and Ismaili, and Sarfistani [8]. The presence of this dimension suggests that organisational culture plays a fundamental role in the effective adoption and use of AI in human resource development. An open and learning-oriented organisational culture encourages innovation and collaboration among employees and reduces resistance to technological change. Furthermore, a supportive organisational culture motivates employees to acquire the skills necessary to work with new technologies and enables the development of more effective human resource processes.

Another dimension is the ability to interpret and analyse results, which is consistent with Hosseini's study [11]. The presence of this dimension indicates that the ability to analyse results derived from AI is vital for making human resources decisions. Analytical skills and the ability to derive actionable insights from complex data enable managers and employees to make better decisions in human resource management and improve human resource development strategies.

Another dimension is personal innovation, which is consistent with the research of Nick Fargam and Shahzad et al. [12], [20]. This dimension suggests that personal innovation among employees plays a crucial role in leveraging artificial intelligence, enhancing an individual's ability to generate new ideas, solving problems creatively, and improving human resources processes. This dimension highlights the importance of fostering creativity and motivation among employees to actively participate in digital transformation and human resource development

Organisational strategy and vision are among the other antecedent dimensions. This finding is consistent with research conducted by Yazdani and Hakimnia, Rahdarpour, Abbasi and Esmaili, Akbari and Tahmisi, and Sarvestani [8], [14], [17]. The presence of this dimension suggests that a clear organisational strategy and vision paves the way for the effective use of artificial intelligence in human resource development, and that strategic organisational planning facilitates coordination between new technologies and human resource objectives. This dimension highlights the importance of formulating long-term policies and objectives that enhance employee productivity, innovation and effectiveness within the context of digital transformation.

Another dimension relates to organisational structure and operational factors. This finding is consistent with studies conducted by Abbasi and Esmaili and Yu et al. [8].

The presence of this dimension suggests that sound organisation and the design of effective internal processes play a vital role in the effective use of AI for human resource development. A flexible organisational structure and coordinated processes enable the rapid flow of information, timely decision-making, and improved collaboration between different units, thereby fostering innovation and the continuous improvement of employee performance.

The other dimension is managerial structures, a finding consistent with the study conducted by Yu et al. The presence of this dimension indicates that an organisation's managerial structures play a key role in facilitating and guiding the effective use of AI in human resource development. Effective and logical hierarchical management facilitates better coordination between units and the optimal allocation of resources, and supports data-driven decision-making, thereby enhancing the efficiency and effectiveness of human resource initiatives.

The other dimension is operational structures. This finding is consistent with the study conducted by Yu et al. The presence of this dimension indicates that the organisation's operational structures provide a clear framework and specific procedures for implementing AI in human resource development. These structures facilitate the flow of information, reduce task overlap, standardise processes, and increase operational efficiency, playing a crucial role in achieving the strategic objectives of AI in human resources.

The other dimension is the collaboration between technology and human resources management. This finding is consistent with Hosseini's research [11]. The presence of this dimension suggests that continuous interaction and collaboration between the IT department and the HR unit play a key role in the successful implementation of AI within the organisation. This collaboration leads to the alignment of technological objectives with human needs, improves decision-making processes, enhances employee productivity, and facilitates the adoption of new technologies.

External conditions have been identified as another antecedent factor. This finding is consistent with the study conducted by Yu et al. This dimension suggests that environmental and external factors, such as legal pressures, market competition, technological trends and societal expectations, play a significant role in the adoption of AI and its impact on human resource development. Taking external conditions into account enables organisations to design strategies appropriate to their environment and to optimise the impact of AI on human resource performance.

The competitive environment was identified as another antecedent factor. This finding is consistent with the study conducted by Akbari Emami and Tahmasebi [14]. The presence of this dimension suggests that the level of competition in the workplace, the intensity of competitive pressures, and competition with peer organisations have a significant impact on the adoption of AI and its effectiveness in human resource development. Organisations operating in a dynamic competitive environment must utilise AI to increase efficiency, improve decision-making, and enhance their employees' skills in order to remain in the competitive market and gain a competitive advantage.

The other dimension is industry-specific requirements. This finding is consistent with the study conducted by Akbari Emami and Tahmasibi [14]. The presence of this dimension indicates that the level of competition in the work environment, the intensity of competitive pressures, and competition with peer organisations have a significant impact on the adoption and effectiveness of AI in human resource development. The presence of this dimension suggests that the unique characteristics and requirements of each industry necessitate a specialised focus on human resource development through AI. Organisations must utilise AI tools and methods in human resource management, in line with the nature of their activities and the specific requirements of their industry, to enhance efficiency, flexibility, and the ability to adapt to environmental changes.

The other dimension is the impact of social media. This finding is consistent with studies conducted by Nick Fargam and Shahzad et al [12], [20]. The presence of this dimension suggests that social media acts as a key tool in facilitating the flow of information and enhancing organisational interactions, and can play an important role in the adoption and successful implementation of AI in the field of human resources. The adoption of AI without employee support and acceptance may face resistance and inefficiency, but the presence of social media keeps employees informed about the workings of this technology and its benefits, motivating them to participate in organisational changes and develop the skills necessary to utilise AI. Furthermore, successful organisations strategically manage digital interactions and internal and external communication networks to embed organisational learning, knowledge transfer and a culture of innovation throughout the organisation.

Another dimension is technological awareness. This finding is consistent with studies conducted by Nick Fargam and Shahzad et al [12], [20]. The presence of this dimension suggests that the level of technological awareness among an organisation's staff and managers is a key factor in the successful implementation of AI for human resource development. Technological awareness refers to an understanding of the capabilities, limitations and various applications of new technologies within the organisational environment. It enables individuals to make better decisions regarding the use of AI, reduces resistance to change, and ensures that organisational processes are implemented more efficiently. This dimension also suggests that organisations whose employees and managers possess sufficient technological knowledge can identify opportunities for innovation and effectively integrate AI technologies into their human resource strategies and processes.

The other dimension is ethical considerations, transparency, trust, and legal and regulatory compliance. This finding is consistent with the research of Yazdani and Hakimnia, Hosseini, Akbari and Tahmasibi, Sarvestani, and Yu et al [11], [14], [17]. The presence of this dimension indicates that adherence to ethical principles and transparency, building trust between employees and management, and compliance with laws and regulations play a vital role in the successful implementation of AI in human resource development. These ethical and legal dimensions ensure that the use of new technologies is consistent with human rights and values, prevent violations and

discrimination, and increase employees' trust in intelligent processes. Furthermore, transparency in communication and decision-making enhances employee engagement and acceptance of technological changes. The presence of this dimension indicates that the success of AI is not limited to technical capabilities and data alone; rather, attention to human and legal components paves the way for improved human resource performance.

The other dimension is resources and infrastructure. This finding is consistent with the research by Rahdarpour. The presence of this dimension suggests that access to sufficient resources and appropriate infrastructure, including hardware, software, data networks and analytical tools, plays a key role in the successful implementation of AI in human resource development. Without the necessary infrastructure, even with the right talent and precise strategies, the productivity of AI will be limited. This dimension indicates that investment in infrastructure and optimal resource management is an essential prerequisite for achieving the objectives of digitising HR processes, enabling rapid and secure access to information for data-driven decision-making.

The final dimension is the expected benefits. This finding is consistent with research conducted by Agrawal and Goswami et al [19]. The presence of this dimension suggests that stakeholders' and end-users' awareness and understanding of the benefits offered by AI is a key factor in the successful implementation of AI projects in the field of human resource development. When employees and managers recognise the potential benefits of this technology, such as improved productivity, reduced errors, easier data-driven decision-making, time savings, and an enhanced employee experience, their adoption of and engagement with AI systems increases. This dimension suggests that perceived benefits not only create an incentive for the effective use of AI, but also help to foster a culture of innovation and improve the overall performance of human resources.

A qualitative discussion and review of post-implementation factors

The first dimension identified in relation to post-implementation aspects is the reduction in human resource costs and financial implications. This finding is consistent with the research of Yazdani and Hakimnia, Nazari Pour and Zakari, Akbari and Tahmasibi, Eslami and Khodayari, Sarvestani and Piranzadeh, and Yu et al. (2023). The presence of this dimension suggests that the application of artificial intelligence in the field of human resources can lead to improved processes, reduced operational and administrative costs, and minimised waste of resources. This is linked to a reduction in the need for repetitive tasks performed by staff, improved productivity, and a reduction in human error, ultimately leading to improved financial indicators and an increase in the organisation's return on investment. Indeed, the application of AI technologies not only reduces the direct costs associated with recruiting, training and retaining staff, but also brings about indirect effects such as lower staff turnover, improved time management and greater accuracy in HR decision-making.

Another aspect involves reducing errors, increasing accuracy and preventing fraud. This finding is consistent with research conducted by Rahdarpour, Eslami and Khodiari, and Rahdarpour. The presence of this dimension suggests that the use of

artificial intelligence in human resources processes can significantly reduce human errors resulting from fatigue, inattention, cognitive limitations, and individual biases. Thanks to their ability to process vast amounts of data quickly and perform algorithmic analysis, intelligent systems can identify and correct systemic and human errors more effectively than traditional methods. Furthermore, through the use of algorithmic analysis and machine learning, AI enables continuous monitoring of transactions, employee records, and financial and administrative processes, thereby increasing organisational transparency and facilitating the rapid detection of potential irregularities. Examples of this impact include reducing fraud in payroll and benefits, preventing the falsification of employment records, identifying anomalies in performance appraisals, and monitoring recruitment and promotion processes. Ultimately, increased accuracy and reduced errors foster trust between employees and managers and improve the compliance of HR processes with regulatory and legal standards. This not only leads to financial savings as a result of reduced errors and irregularities, but also, in the long term, enhances the organisation's credibility and transparency and mitigates risks associated with its corporate reputation.

Another dimension involves the improvement of processes and procedures, as well as attendance and punctuality (discipline). This finding is consistent with research conducted by Abbasi and Ismaili, Hosseini , and Nazari Pour and Zakiri. The presence of this dimension suggests that AI, by automating repetitive and time-consuming tasks such as attendance recording, shift management, leave processing and monitoring of working hours, reduces rework, speeds up administrative processes and strengthens the organisational system. Furthermore, AI-based systems can utilise behavioural data processing and machine learning algorithms to identify and analyse patterns of unauthorised absence, lateness, or disciplinary issues. In doing so, they can enhance workforce productivity and reduce costs arising from operational inefficiencies. Furthermore, this approach can enhance transparency and fairness in assessing staff attendance, as data is automatically recorded and analysed, reducing the likelihood of managerial bias. Ultimately, streamlining these processes not only saves time and resources but also enhances employee job satisfaction and organisational discipline in the long term.

Another dimension involves data-driven decision-making and the anticipation of needs. This finding is consistent with research conducted by Abbasi and Ismaili, Hosseini, Salehi-Sadeq, Sayed Naghavi et al, and Surai. The presence of this dimension suggests that the use of artificial intelligence in human resources can lead to a shift in decision-making approaches from traditional and intuitive methods to data- and evidence-based approaches. By analysing comprehensive data on employees and the organisation, AI enables the prediction of future HR needs, such as workforce planning, skills gaps, training requirements, succession planning, and even employee turnover management. This approach ensures that key HR decisions are not only made more quickly and accurately, but also that the risk of poor decision-making is significantly reduced. Furthermore, data-driven decision-making promotes transparency, consistency

and strategic alignment across different departments, as all policies and procedures are based on measurable evidence and analysis. Furthermore, this approach to decision-making can play a crucial role in improving individual and organisational performance by identifying trends in employee behaviour and anticipating their motivational and development needs. Another aspect concerns performance evaluation and increased productivity. This finding is consistent with research conducted by Abbasi and Esmaili, Ghlami, Hosseini, Salehi Sadeh, Nazari Pour and Zakiri, Akbari and Tahmisi, Akuba, Elias and Gaid, Laviolet et al, Gomi and Ibrahim, Yu et al, and Jin et al. The presence of this dimension suggests that the application of artificial intelligence in human resource management can improve the employee performance appraisal process and increase individual and organisational productivity. By analysing employee performance data, AI systems can provide accurate, fair and objective assessments, thereby reducing human error and bias in the evaluation process and leading to well-founded, evidence-based management decisions. Furthermore, AI can identify employees' performance patterns, strengths, weaknesses and progress over time, and suggest opportunities for improvement and development. Ultimately, enhancing the accuracy of performance appraisals and utilising intelligent analytics leads to increased employee motivation, a stronger performance-oriented culture, and improved organisational productivity. This also enables targeted planning for employee training and development and the optimal allocation of human resources, helping the organisation to enhance its performance and efficiency in dynamic and competitive environments. Another aspect is the automation of processes. This finding is consistent with the research of Housini, Nawaz et al, DiMa et al, Laviolette et al, and Ghomi and Ebrahimi. The presence of this dimension suggests that the application of AI in the field of human resources can lead to the automation of many repetitive, time-consuming and error-prone processes, thereby reducing the need for human intervention in routine and routine stages. AI systems can automatically perform tasks such as recording and processing employee information, managing leave, scheduling shifts, monitoring performance, and generating reports. This automation leads to faster task completion, reduced human error, and lower operating costs. Furthermore, by freeing staff from repetitive tasks, they can focus on strategic and value-adding activities, thereby improving the quality of decision-making and organisational services. Ultimately, process automation not only improves efficiency and reduces the workload on staff but also enhances transparency and accuracy in human resource management, helping the organisation to carry out operations more quickly and accurately with lower risk. Another aspect is the improvement in time management and the speed of task completion. This finding is consistent with research conducted by Hashemi, Nazari-Pour and Zakari, Nawaz et al, Dima et al, and Shahzad et al. this aspect suggests that the use of artificial intelligence in human resources can lead to improved operational efficiency, reduced task completion times, and faster organisational decision-making. By analysing data and automating various stages, AI enables the optimal management of time allocated to administrative and operational activities, thereby preventing unnecessary rework and delays. This technology can facilitate the accurate

scheduling of shifts, the prioritisation of tasks, and the tracking of project progress, enabling employees and managers to manage their time more effectively and focus on value-added activities. Increased speed and improved time utilisation, in addition to boosting productivity, also reduce the workload and pressure on staff, increase job satisfaction, and improve organisational discipline. This helps the organisation to carry out operations more quickly, more coherently, and to a higher standard, and enhances its ability to respond to environmental changes and urgent needs. Another dimension is development and training. This finding is consistent with the research of Rahdarpour, Abbasi and Esmaili, Ghorbani and Ataifar, Gholami, Hosseini, Salehi Sadeh, Nazari Pour and Zakeri, Akbari and Tahmisi, and Borshabi, Rajabi and Atabour, Elias and Ghadir Laviolet et al, Ghoumi and Ebrahimi, Choudhury et al and Jin et al. The presence of this dimension suggests that the use of artificial intelligence can play an important role in enhancing skills, organisational learning and the development of employee competencies. By analysing performance data and identifying skills gaps, AI enables the design of tailored training programmes, the prediction of training needs, and the mapping of career development pathways for employees. This technology can facilitate the learning process by suggesting appropriate courses, training content and learning opportunities, and can make training available anytime, anywhere. AI systems can monitor and evaluate the effectiveness of training programmes, and by providing continuous feedback, enhance the quality of training and encourage continuous learning among employees. Consequently, by increasing workforce capabilities, strengthening core skills, and developing latent talent, the organisation works to improve its productivity and performance.

There is another aspect relating to recruitment and appointment. This finding is consistent with the research of Rahdarpour, Abasi and Esmaili, and Ghlami, Hosseini, Salehi Sadeh, Nazari Pour and Zakiri, Akbari and Tahmisi, Aslani and Khodiari, Rajabi and Atabour, Sarvestani and Piranzadeh, Elias and Ghadir, Laviolet et al, Lee et al, and Jin et al The existence of this dimension suggests that the application of artificial intelligence can improve the recruitment and hiring process, and increase the accuracy, speed and quality of hiring decisions. By analysing data relating to applicants' employment history, skills, competencies and behaviours, artificial intelligence enables the identification of the best candidates and the prediction of their suitability for the organisation's needs. This technology can automate CV assessment, manage tests and analyse interview data, thereby reducing human error and bias in staff selection. Furthermore, the use of AI in recruitment reduces the time taken by the recruitment process, increases transparency and fairness in selection, and improves the candidate experience. The end result is the recruitment of highly competent staff who align with the organisation's strategic objectives, which can improve its overall performance and productivity.

Another dimension relates to human resource planning and strategy formulation. This finding is consistent with research conducted by Akuba, Lafiolite et al, and Gomi and Ibrahim. The presence of this dimension suggests that the use of AI can improve the

human resource planning process and assist in developing more accurate, data-driven strategies for workforce management. By analysing data collected from employee performance, labour market trends and organisational needs, AI enables the prediction of workforce requirements, the identification of skills gaps, and the design of strategic development programmes. This technology can help HR managers make strategic decisions based on evidence and rigorous analysis, allowing them to focus on long-term planning aligned with the organisation's objectives, rather than relying on traditional, intuitive decision-making. Furthermore, integrating AI into HR planning enhances the accuracy of workforce allocation, improves career development processes, and boosts the organisation's overall performance. This aspect also enhances strategic coordination between different departments and flexibility in responding to environmental changes, ultimately leading to increased productivity, resilience and organisational success.

The other dimension is skills, a finding consistent with research conducted by Dima et al, Laviolet et al, Gomi and Ibrahim, Yu et al, and Kramarenko et al. The presence of this dimension suggests that the application of artificial intelligence can help identify, enhance and improve employees' skills, thereby facilitating professional development. By analysing performance data, job requirements and market trends, AI enables the identification of skills gaps, the design of targeted training programmes, and the provision of pathways for individual and professional development. This technology can deliver personalised training and learning based on employees' actual performance, thereby strengthening core and specialised skills within the organisation. Skills enhancement using AI boosts organisational resilience, enables rapid responses to environmental changes, and fosters innovation and creativity among staff.

Another dimension relates to job design and task optimisation. This finding is consistent with research conducted by Abbasi and Ismaili, Diya et al, and Chaudhary et al. The presence of this dimension suggests that AI can improve the process of job design and task allocation, thereby increasing employee efficiency and job satisfaction. By analysing data on employee performance, skills and workload, AI enables the optimisation of tasks, a balanced distribution of work, and the alignment of roles with individual capabilities. This technology can automate repetitive and time-consuming tasks, allowing employees to focus more on creative and value-generating activities. Furthermore, AI-supported job design improves job satisfaction, reduces stress and increases employee motivation. This approach also aligns individual goals with organisational objectives, boosts productivity, and enhances organisational performance, enabling the organisation to respond to environmental changes more effectively and flexibly. Another dimension involves improving the employee experience and reducing discrimination. This finding is consistent with research conducted by Yazdani and Hakimnia and Hosseini. The presence of this dimension suggests that the use of AI can enhance the employee experience and foster an environment that helps reduce discrimination and inequality within the organisation. By analysing performance data, assessment trends and employee feedback, AI systems can identify potential areas of weakness and sources of discrimination within organisational processes and provide

recommendations for improvement. Furthermore, this technology can make appraisal, promotion, reward and resource allocation processes transparent and fair, preventing managers from applying personal bias. Increased fairness and transparency in the workplace leads to improved job satisfaction, increased motivation and enhanced organisational commitment among employees. Furthermore, improving the employee experience through AI can foster a positive and supportive organisational culture, which ultimately contributes to increased productivity and the sustainability of human resources.

Another dimension is employee engagement. This finding is consistent with the research conducted by Gholami. The presence of this dimension suggests that AI can increase the level of employee engagement in decision-making and organisational processes, thereby enhancing their sense of belonging and responsibility. By providing access to data and transparent analytics, AI systems facilitate employee participation in decision-making and the submission of suggestions. This technology can also enhance opportunities for interaction and collaboration between employees and teams, creating an environment in which their ideas and opinions are listened to and effectively taken into account. Increased employee engagement leads to improved motivation, job satisfaction and organisational commitment, thereby enhancing both individual and collective organisational performance.

Another dimension relates to employee motivation and satisfaction. This finding is consistent with research conducted by Hashemi, Yu et al, and Chaudhry et al. The presence of this dimension suggests that the use of artificial intelligence can increase employee motivation and job satisfaction, and help create a positive and dynamic work environment. By analysing data relating to performance, needs and employee feedback, AI enables the identification of factors influencing motivation and satisfaction, the design of incentive programmes, and the provision of tailored suggestions to enhance job satisfaction. This technology can improve opportunities for personal growth and development, ensure the fair distribution of rewards, and enhance working conditions, leading to employees feeling more valued and having a stronger sense of belonging. Increased employee motivation and satisfaction have a direct impact on strengthening organisational commitment, reducing staff turnover, and boosting productivity. A supportive and motivating work environment, enhanced by artificial intelligence, can foster creativity, innovation and collaboration among employees, ultimately leading to improved overall organisational performance and sustainable success.

Another aspect of work autonomy is psychological confidence and reassurance. This finding is consistent with the research conducted by Chaduri et al. The presence of this dimension suggests that AI enhances employees' sense of autonomy, self-confidence and psychological well being, leading to improved mental health and work motivation. By providing rapid and accurate access to data, supporting decision-making, and reducing errors and ambiguity in the workplace, it enables employees to perform their duties with greater confidence and feel that their ability to manage their tasks has been enhanced. This technology can increase transparency and fairness in organisational

processes and prevent the emergence of uncertainty and mistrust. Psychological autonomy and trust lead to increased motivation, creativity, engagement and organisational commitment, enabling employees to contribute to the organisation's goals with higher levels of performance and job satisfaction. This dimension allows the organisation to foster a culture of trust and accountability and create a healthy and supportive work environment.

Another dimension is personalisation. This finding is consistent with research conducted by Akuma. The presence of this dimension indicates that AI is capable of personalising the work experience and interaction with employees based on individual needs, capabilities and preferences, leading to increased satisfaction and productivity. By analysing individual data and performance metrics for each employee, AI enables the provision of solutions, training, tasks and feedback tailored to suit personal characteristics and needs. This personalisation motivates employees to perform their duties with greater enthusiasm and a sense of value, providing them with opportunities for growth and learning that align with their career paths. Furthermore, personalising the work experience can increase employee engagement and commitment to the organisation, foster creativity and innovation, and consequently improve organisational performance. This demonstrates that AI is capable of creating a flexible working environment that responds to individual needs, which is vital for human resource development and improving organisational productivity.

The other dimension is innovation. This finding is consistent with research conducted by Salihi Siddiq, Eikoma, and Chaudhry et al. The presence of this dimension suggests that AI is capable of improving organisational and human resources processes through an innovative approach, paving the way for the creation of new ideas and solutions within the organisation. By analysing data, identifying trends, and providing intelligent predictions, AI enables the generation of new ideas, the optimisation of processes, and the creation of innovative solutions. This technology can enhance opportunities for innovation in job design, skills development, training programmes, and human resources management methods, putting the organisation on a path of continuous improvement and competitiveness. Fostering innovation through AI increases employee motivation and engagement, strengthens creative thinking, and enhances the organisation's ability to respond to environmental changes. AI can create a dynamic, creative, and innovative organisational environment, which is vital for human resource development and improved organisational performance.

Another dimension is knowledge management. This finding is consistent with research conducted by Akuma, Lafiollet et al, and Gami and Ibrahimi. This dimension of AI enables the improvement of knowledge management processes within the organisation, facilitating rapid access to, organisation of, and effective utilisation of institutional information and expertise. Through data analysis and the identification of tacit and explicit knowledge patterns, AI enables the targeted and intelligent storage, retrieval and sharing of information. It can assist managers and staff in making better evidence-based decisions, thereby preventing rework and the loss of organisational

knowledge. Enhancing knowledge management efficiency through AI fosters collaboration between departments, encourages organisational learning and stimulates innovation. It also promotes a culture of continuous learning and improvement within the organisation, ultimately boosting its productivity and performance.

Another dimension relates to support and guidance. This finding is consistent with the research conducted by Borsabi (2022). The presence of this dimension suggests that artificial intelligence can play an effective role in providing support and guidance to employees, thereby facilitating the learning process and task performance. By providing intelligent guides, decision-support systems and responses to staff queries, AI enables tasks to be performed quickly and accurately, helping to reduce confusion and human error. It can also identify staff needs in real time and provide appropriate resources for problem-solving and skills development. Increased support and guidance lead to improved self-confidence, greater motivation and enhanced employee performance, thereby fostering a culture of collaboration and continuous learning within the organisation. This aspect demonstrates that AI can create a supportive and responsive work environment that helps employees achieve both individual and organisational goals.

Another dimension relates to improved management. This finding is consistent with the research conducted by Yazdani and Hakimnia. The presence of this dimension indicates that AI is capable of enhancing the quality of the managerial decision-making process and enabling managers to achieve the organisation's strategic objectives. By analysing organisational data, forecasting trends, and providing accurate analytical reports, AI enables managers to make quick, intelligent, and evidence-based decisions. This technology can help managers identify problems, prioritise resources, and improve processes, thereby increasing the effectiveness and efficiency of management. Enhancing management through AI leads to improved coordination between departments, reduced decision-making risks, and strengthened managerial capabilities in the face of environmental changes. This dimension demonstrates that AI can steer the organisation towards sustainability, productivity, and long-term success.

Another dimension relates to professional relationships and interactions among employees. This finding is consistent with research conducted by Dima et al, Laviolette et al, Yu et al, and Chaudhary et al. The presence of this dimension suggests that AI can improve the quality of professional relationships and interactions among employees, thereby creating an interactive and collaborative work environment. By analysing communication data, team performance, and internal organisational networks, AI enables the identification of strengths and weaknesses in interactions, facilitates collaboration between teams, and improves the flow of information. This technology can enhance communication between employees and managers, increase coordination between departments, and foster effective collaboration and organisational synergy. Strengthening working relationships and interactions among employees leads to increased motivation, job satisfaction, organisational commitment and team creativity,

which ultimately contributes to improved overall organisational performance, increased productivity and the creation of a positive and supportive organisational culture.

Another dimension is employee retention and continued employment. This finding is consistent with studies conducted by Akbari and Tahmasibi and Rajabi and Atabour. This dimension suggests that AI can play an effective role in reducing staff turnover and increasing their loyalty to the organisation, thereby ensuring human resource stability. By analysing data on performance, job satisfaction, needs and employee behaviours, AI enables the identification of risk factors associated with staff turnover, the design of employee retention programmes, and the provision of tailored recommendations to enhance satisfaction and commitment. This technology can enhance opportunities for personal growth and development, improve working conditions, and facilitate the implementation of fair reward systems, thereby increasing employee retention. Increased employee retention leads to reduced replacement and training costs, increased organisational expertise and efficiency, and enhanced organisational commitment and engagement. This demonstrates that artificial intelligence can create a sustainable, supportive and responsive working environment, where employees are more motivated, satisfied and committed, and the organisation benefits from its valuable human resources. The final dimension is wages, salaries and bonuses (employee welfare). This finding is consistent with the conclusions reached by Abbasi and Ismaili, Ghlami, Akbari and Tahmisi, and Kramarenko et al. The presence of this dimension suggests that AI can play a significant role in improving pay and compensation systems and enhancing employee well-being, thereby increasing their job satisfaction and commitment. By analysing data relating to performance, the labour market and internal organisational metrics, AI enables the fair and optimal distribution of salaries and benefits, the design of bespoke compensation packages, and the prediction of employees' wellbeing needs. This technology can enhance transparency and fairness in reward and compensation systems, thereby preventing potential discrimination or inequality. Optimising salaries and compensation leads to increased motivation and job satisfaction, reduced staff turnover, and strengthened organisational commitment [24], [25]. Furthermore, this demonstrates that AI can create a supportive and sustainable work environment where employees feel more valued and experience greater well-being, and where the organisation can benefit from a talented and committed workforce.

CONCLUSION

Fundamental Finding: (1) Technology and Infrastructure Integration: The success of AI in human resource development in Iraqi hospitals is contingent upon the establishment of a solid technological infrastructure, including advanced hardware, software, and high-quality data systems. This aligns with previous research emphasizing the need for integrated systems and strong communication networks. **(2) Quality of Information and Communication**: Accurate, timely, and standardized information, along with transparent communication channels, is essential for the successful deployment of AI in human resources. This enhances decision-making and trust within

organizations. **(3) Data Mining for Enhanced Decision-Making**: Efficient data mining is crucial for identifying patterns, predicting outcomes, and making data-driven decisions in human resource management. This leads to smarter, more personalized policies. **(4) AI's Impact on Performance and Costs**: AI helps reduce human resource costs, errors, and fraud, while increasing operational efficiency and process automation. It enhances decision-making by shifting from traditional methods to data-driven approaches. **Implication: (1) Infrastructure Development**: Hospitals and organizations need to prioritize the improvement of their technological infrastructure for AI integration. This will enhance productivity, resource allocation, and employee performance. **(2) Enhanced Decision-Making**: By ensuring that data quality and communication are prioritized, AI can improve decision-making accuracy, fostering organizational trust and efficient human resource management. **(3) Skill Development and Training**: Continuous training and skills development programs are critical for maximizing AI's potential. Organizations should invest in equipping employees with the necessary tools and knowledge to work effectively with AI systems. **(4) Change Management and Organizational Culture**: Successful AI implementation is linked to organizational readiness, positive attitudes toward technology, and an adaptive culture. Organizations must manage change effectively to reduce resistance and increase the adoption of AI. **Limitation: (1) Dependency on Technological Readiness**: The effective use of AI depends heavily on the technological readiness and infrastructure available. Without a strong technical foundation, AI cannot function optimally. **(2) Resistance to Change**: Employee and managerial resistance to new technologies can hinder the implementation of AI in human resources. This highlights the challenge of fostering a culture that is receptive to technological changes. **(3) Data Quality Concerns**: Incomplete, inconsistent, or inaccurate data can affect the effectiveness of AI systems. Without high-quality data, AI's ability to provide reliable insights and decision-making is limited. **(4) Resource Constraints**: Organizations may face financial and logistical constraints in acquiring the necessary hardware, software, and infrastructure for AI adoption, especially in resource-limited environments. **Future Research: (1) Exploring AI's Long-Term Effects on Human Resource Development**: Further studies could explore how AI impacts human resource development over a longer period, particularly in the context of organizational growth and transformation. **(2) Expansion to Other Sectors**: While this research focuses on hospitals, future studies could explore the application of AI in human resource management across different industries and sectors. **(3) Ethical Implications of AI**: There is a need for further research into the ethical considerations of using AI in human resources, particularly regarding data privacy, fairness, and transparency. **(4) Impact of AI on Organizational Structure**: Future research could examine how AI influences the structure of organizations, including decision-making hierarchies, employee roles, and collaboration between departments.

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