ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT AND EMPLOYEE PERFORMANCE: THE MEDIATING ROLE OF EMPLOYEE ENGAGEMENT AND THE MODERATING ROLE OF DIGITAL COMPETENCY

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ABSTRACT
Artificial intelligence has become an important driver of digital transformation within human resource management by improving recruitment, employee development, performance management, and workforce planning. Despite the increasing adoption of artificial intelligence-supported human resource management practices, empirical evidence explaining how these practices influence employee performance remains limited, particularly in developing economies. Therefore, this study investigates the effect of artificial intelligence-driven human resource management on employee performance while examining the mediating role of employee engagement and the moderating effect of digital competency.

A quantitative research design based on a correlational survey model was employed. Data were collected from 369 employees working in public and private organizations located in Nicosia, Kyrenia, and Famagusta in the Turkish Republic of Northern Cyprus. The proposed conceptual model was analyzed using IBM SPSS Statistics 29.0 and AMOS 24.0. Descriptive statistics, reliability analysis, confirmatory factor analysis, correlation analysis, multiple regression analysis, structural equation modeling, bootstrapping mediation analysis, and moderation analysis were conducted.

The findings revealed that artificial intelligence-driven human resource management has a positive and significant effect on employee performance. Employee engagement was found to partially mediate this relationship, indicating that AI-supported human resource practices improve employee performance by increasing employees' psychological involvement and commitment to their work. Furthermore, digital competency significantly moderated the relationship between artificial intelligence-driven human resource management and employee performance, demonstrating that employees with higher levels of digital competency benefit more from AI-supported HR practices. All proposed hypotheses were supported, and the structural model demonstrated satisfactory reliability, validity, and goodness-of-fit indices.

The study contributes to the human resource management and organizational behavior literature by integrating artificial intelligence-driven human resource management, employee engagement, digital competency, and employee performance into a comprehensive conceptual framework. The findings also provide practical implications for managers, human resource professionals, and policymakers seeking to improve workforce performance through AI-supported human resource practices.
Key Words: Artificial intelligence, human resource management, employee performance, employee engagement, digital competency, digital transformation, organizational behavior.

Introduction

The rapid advancement of artificial intelligence (AI) has significantly transformed organizational operations, particularly in the field of Human Resource Management (HRM). AI technologies have evolved from supporting routine administrative functions to becoming strategic tools that enhance workforce planning, recruitment, performance evaluation, employee development, and talent management. Through machine learning, predictive analytics, natural language processing, and intelligent decision-support systems, organizations are increasingly adopting AI-driven HRM practices to improve efficiency, reduce operational costs, and strengthen organizational performance. Consequently, AI has become an essential driver of digital transformation within modern human resource management (Marler & Boudreau, 2017; Huang & Rust, 2022; Dwivedi et al., 2023).

Artificial Intelligence-Driven Human Resource Management (AI-HRM) refers to the integration of AI technologies into HR functions to support data-driven decision-making and optimize employee management processes. AI applications such as intelligent recruitment systems, automated resume screening, predictive performance analytics, AI-supported learning platforms, employee sentiment analysis, and personalized career development systems enable organizations to make faster and more objective HR decisions. These technologies

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not only improve administrative efficiency but also contribute to employee development and organizational competitiveness (Vrontis et al., 2022; Strohmeier, 2020).

Employee performance remains one of the most important determinants of organizational success. High-performing employees contribute to increased productivity, innovation, service quality, and sustainable competitive advantage. Contemporary organizations increasingly recognize that employee performance is influenced not only by individual capabilities but also by organizational support, technological infrastructure, leadership practices, and employee experiences. As AI-supported HRM systems provide personalized feedback, competency-based development, and data-driven performance evaluations, they have the potential to significantly improve employees' work performance (Aguinis, 2019; Alshurideh et al., 2024).

An important mechanism through which AI-supported HRM practices may improve employee performance is Employee Engagement. Employee engagement refers to a positive and fulfilling psychological state characterized by vigor, dedication, and absorption in work. Engaged employees demonstrate higher motivation, stronger organizational commitment, greater discretionary effort, and improved job performance. AI-supported HR systems may increase engagement by improving communication, providing personalized learning opportunities, supporting career development, and enhancing employees' work experiences. Consequently, employee engagement may function as a mediating mechanism linking AI-supported HRM practices to employee performance (Schaufeli et al., 2002; Saks, 2022).

Another important factor influencing the effectiveness of AI-supported HRM is Digital Competency. Digital competency refers to employees' knowledge, skills, confidence, and ability to effectively use digital technologies in their daily work. Employees possessing higher digital competency are generally more capable of adapting to AI-supported HR systems, utilizing digital learning platforms, interpreting AI-generated performance feedback, and collaborating with intelligent technologies. Therefore, digital competency may strengthen the positive relationship between AI-driven HRM practices and employee performance (van Laar et al., 2020; European Commission, 2022).

The Turkish Republic of Northern Cyprus (TRNC) has also experienced a gradual digital transformation in organizational management. Public institutions, universities, banks, tourism enterprises, and private companies operating in Nicosia, Kyrenia, and Famagusta have increasingly adopted digital HR systems to improve recruitment, employee development, and performance management. However, empirical evidence regarding the effectiveness of AI-supported human resource management practices remains limited within the TRNC context. Moreover, the mediating role of Employee Engagement and the moderating effect of Digital Competency have not yet been comprehensively investigated among employees working in the region.

Accordingly, this study investigates the effect of Artificial Intelligence-Driven Human Resource Management on Employee Performance among employees working in organizations located in Nicosia, Kyrenia, and Famagusta in the Turkish Republic of Northern Cyprus. Furthermore, the study examines the mediating role of Employee Engagement and the moderating effect of Digital Competency. Data were collected from 369 employees, and the proposed conceptual model aims to contribute to the literature on artificial intelligence, human resource management, organizational behavior, and digital transformation while providing practical recommendations for HR professionals, organizational leaders, and policymakers.

Problem Statement

Artificial intelligence has become one of the most influential technologies reshaping human resource management by enabling organizations to automate HR processes, improve decision-making, and provide data-driven employee management. AI-supported HRM practices such as intelligent recruitment, automated performance evaluation, predictive workforce analytics, and personalized learning systems have the potential to improve employee performance and organizational effectiveness. Despite these technological advancements, organizations continue to face challenges in understanding how AI-driven HRM practices influence employees' behavioral and performance outcomes (Marler & Boudreau, 2017; Dwivedi et al., 2023).

Previous studies have demonstrated positive relationships between digital HR technologies and organizational performance. However, relatively limited empirical evidence explains the mechanisms through which AI-supported HRM contributes to employee performance. In particular, the role of Employee Engagement as a mediating variable remains insufficiently examined. Since engaged employees demonstrate higher levels of motivation, commitment, and productivity, understanding how AI-supported HRM enhances engagement is essential for explaining improvements in employee performance (Schaufeli et al., 2002; Saks, 2022).

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Employees also differ considerably in their ability to adapt to digital technologies. Individuals possessing higher levels of Digital Competency are generally more capable of utilizing AI-supported HR systems, interpreting digital performance feedback, and participating in technology-enabled learning and development activities. Consequently, digital competency may strengthen or weaken the effectiveness of AI-supported HRM practices. Despite its growing importance, limited empirical research has investigated whether digital competency moderates the relationship between AI-driven HRM and employee performance, particularly in developing economies (van Laar et al., 2020; European Commission, 2022).

In the Turkish Republic of Northern Cyprus, organizations located in Nicosia, Kyrenia, and Famagusta have increasingly implemented digital human resource systems and AI-supported HR applications. Nevertheless, empirical studies simultaneously examining the relationships among Artificial Intelligence-Driven Human Resource Management, Employee Engagement, Digital Competency, and Employee Performance remain scarce. This lack of evidence limits organizations' ability to understand how AI technologies influence workforce performance and how employees respond to digital HR transformation.

Therefore, an important research gap exists regarding the mechanisms through which AI-supported human resource management improves employee performance within the TRNC. To address this gap, the present study investigates the relationship between Artificial Intelligence-Driven Human Resource Management and Employee Performance among 369 employees working in organizations located in Nicosia, Kyrenia, and Famagusta. Furthermore, the study examines the mediating role of Employee Engagement and the moderating effect of Digital Competency, thereby contributing to the literature on human resource management, artificial intelligence, organizational behavior, and digital transformation while providing practical implications for organizations implementing AI-supported HR practices.

Purpose of the Research

The primary purpose of this study is to examine the effect of artificial intelligence-driven human resource management on employee performance among employees working in organizations located in Nicosia, Kyrenia, and Famagusta in the Turkish Republic of Northern Cyprus (TRNC). As organizations increasingly adopt artificial intelligence technologies in human resource functions, understanding how AI-supported HR practices influence employee performance has become an important research topic in both human resource management and organizational behavior literature. This study seeks to provide empirical evidence regarding the effectiveness of AI-driven HRM practices within the context of the TRNC (Marler & Boudreau, 2017; Dwivedi et al., 2023).

The study also aims to investigate whether employee engagement mediates the relationship between artificial intelligence-driven human resource management and employee performance. AI-supported HR practices, including intelligent recruitment, personalized training systems, automated performance evaluation, and AI-assisted career development, are expected to increase employees' psychological involvement, motivation, and commitment to their work. Consequently, higher levels of employee engagement may contribute to improved employee performance by strengthening employees' willingness to exert greater effort toward organizational goals (Schaufeli et al., 2002; Saks, 2022).

Another objective of this research is to determine whether digital competency moderates the relationship between artificial intelligence-driven human resource management and employee performance. Employees with higher levels of digital competency are generally more capable of adapting to AI-supported HR technologies, utilizing digital platforms effectively, and benefiting from intelligent HR systems. Therefore, this study evaluates whether digital competency strengthens or weakens the influence of AI-driven HRM practices on employee performance (van Laar et al., 2020; European Commission, 2022).

Finally, this study aims to contribute to the existing literature by developing and empirically testing a comprehensive conceptual model that integrates artificial intelligence-driven human resource management, employee engagement, digital competency, and employee performance. The findings are expected to provide valuable implications for human resource managers, organizational leaders, policymakers, and researchers by identifying how AI-supported HR practices can be implemented more effectively to improve workforce performance and support organizational competitiveness in an increasingly digital business environment (Vrontis et al., 2022; Alshurideh et al., 2024; Huang & Rust, 2022).

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Importance of the Research

The integration of artificial intelligence (AI) into human resource management has fundamentally transformed the way organizations recruit, develop, evaluate, and retain employees. AI-supported human resource management practices enable organizations to automate routine HR activities, improve decision-making accuracy, personalize employee development, and optimize workforce management through data-driven approaches. Despite the increasing adoption of AI technologies in organizational settings, empirical evidence explaining how AI-driven human resource management influences employee performance remains limited, particularly within developing economies such as the Turkish Republic of Northern Cyprus (TRNC). Therefore, this study addresses an important gap in the literature by examining the relationships among artificial intelligence-driven human resource management, employee engagement, digital competency, and employee performance (Dwivedi et al., 2023; Marler & Boudreau, 2017; Vrontis et al., 2022).

From a theoretical perspective, this study contributes to the literature by integrating four contemporary constructs into a comprehensive conceptual framework. Although previous research has investigated the direct relationship between digital human resource management and organizational outcomes, relatively few studies have simultaneously examined the mediating role of employee engagement and the moderating effect of digital competency. By investigating these variables within a single structural model, this study extends existing knowledge regarding the mechanisms through which AI-supported HR practices improve employee performance and organizational effectiveness (Saks, 2022; Strohmeier, 2020; Alshurideh et al., 2024).

From a practical perspective, the findings are expected to provide valuable guidance for human resource managers, organizational leaders, and policymakers seeking to improve workforce performance through artificial intelligence technologies. Understanding how AI-driven HR practices influence employee performance will assist organizations in designing more effective recruitment systems, performance management processes, employee development programs, and talent management strategies. Furthermore, the findings may support organizations in developing employee-centered digital transformation initiatives that strengthen engagement and improve workforce productivity in increasingly technology-oriented workplaces (Huang & Rust, 2022; Aguinis, 2019; European Commission, 2022).

The study is also significant because it provides empirical evidence collected from 369 employees working in public and private organizations located in Nicosia, Kyrenia, and Famagusta, representing one of the first comprehensive investigations of AI-supported human resource management within the TRNC. As organizations across the region continue investing in digital transformation, understanding employees' perceptions of AI-supported HR practices becomes increasingly important for improving organizational performance and sustaining competitive advantage. The findings may also assist managers in identifying strategies that increase employee engagement while enhancing employees' digital competencies (van Laar et al., 2020; Vrontis et al., 2022; Dwivedi et al., 2023).

Finally, this study establishes a foundation for future research by proposing a conceptual model that can be replicated and validated across different industries, organizational contexts, and cultural settings. Future studies may extend the proposed framework by incorporating additional variables such as organizational commitment, perceived organizational support, innovative work behavior, AI acceptance, organizational culture, or leadership styles. Consequently, this research contributes to the continued development of artificial intelligence, human resource management, organizational behavior, and digital transformation literature while offering practical insights for organizations undergoing technological change (Marler & Boudreau, 2017; Alshurideh et al., 2024; Dwivedi et al., 2023).

1.4.Direct Effect Hypotheses

H1: Artificial intelligence-driven human resource management has a positive and significant effect on employee performance.

H2: Artificial intelligence-driven human resource management has a positive and significant effect on employee engagement.

H3: Employee engagement has a positive and significant effect on employee performance.

Mediation Hypothesis

H4: Employee engagement mediates the relationship between artificial intelligence-driven human resource management and employee performance.

Moderation Hypotheses

H5: Digital competency moderates the relationship between artificial intelligence-driven human resource management and employee performance.

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H5a: The positive relationship between artificial intelligence-driven human resource management and employee performance is stronger among employees with higher levels of digital competency.
H5b: The positive relationship between artificial intelligence-driven human resource management and employee performance is weaker among employees with lower levels of digital competency.

Theoretical Framework

Artificial Intelligence

Definition of Artificial Intelligence

Artificial intelligence (AI) is generally defined as the capability of computer systems to perform tasks that traditionally require human intelligence, including learning, reasoning, problem-solving, perception, language understanding, and decision-making. Unlike conventional computer programs that operate based on predefined instructions, AI systems continuously improve their performance by learning from large volumes of structured and unstructured data through machine learning and deep learning algorithms. These capabilities allow AI technologies to generate predictions, identify patterns, automate complex processes, and support organizational decision-making across numerous industries. As computational power and data availability continue to increase, AI has become one of the most influential technologies driving digital transformation and organizational innovation (Russell & Norvig, 2021; Dwivedi et al., 2023).

Artificial intelligence has evolved beyond simple automation and is increasingly viewed as a strategic organizational resource that creates competitive advantage through intelligent data analysis and predictive capabilities. Organizations utilize AI to optimize operational efficiency, improve customer experiences, support strategic planning, and enhance managerial decision-making. Within organizational settings, AI contributes not only to operational effectiveness but also to innovation, organizational agility, and sustainable performance by transforming traditional business processes into intelligent digital ecosystems (Huang & Rust, 2022; Davenport et al., 2020).

From a human resource management perspective, artificial intelligence represents a technological innovation capable of transforming nearly every HR function. AI enables organizations to automate repetitive administrative activities, improve recruitment accuracy, personalize employee learning, predict workforce needs, and provide objective performance evaluations. Consequently, AI has shifted the role of human resource management from an administrative support function toward a strategic business partner that contributes directly to organizational performance and long-term competitiveness (Vrontis et al., 2022; Strohmeier, 2020).

Recent studies in the Turkish literature similarly emphasize that artificial intelligence has become one of the most important technologies shaping the future of human resource management. Turkish researchers argue that AI applications improve recruitment, talent management, performance evaluation, employee development, and human resource analytics while enabling organizations to make faster and more objective decisions. However, they also underline that successful AI implementation requires organizational readiness, employee acceptance, ethical governance, and continuous digital capability development. These findings indicate that AI should be viewed not merely as a technological innovation but as a strategic organizational transformation tool.

Evolution of Artificial Intelligence

The evolution of artificial intelligence has progressed through several developmental stages over the past seven decades. The concept of artificial intelligence was formally introduced during the Dartmouth Conference in 1956, where researchers proposed that machines could simulate human intelligence through computational methods. Early AI research primarily focused on rule-based systems and symbolic reasoning; however, limited computational capacity and insufficient data restricted practical applications. Since the early 2000s, advances in computing power, cloud technologies, big data, and machine learning algorithms have accelerated the development of AI, transforming it into one of the most influential technologies of the digital economy (Russell & Norvig, 2021; Kaplan & Haenlein, 2020).

The emergence of machine learning, deep learning, neural networks, and natural language processing has significantly expanded the capabilities of artificial intelligence. Modern AI systems continuously learn from historical and real-time data, improving their predictive accuracy and decision-making performance without requiring explicit programming for every task. These developments have enabled organizations to automate complex processes, support strategic planning, and generate valuable insights from large datasets. Consequently, AI has become a fundamental component of digital transformation strategies across both public and private organizations (Dwivedi et al., 2023; Davenport et al., 2020).

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The launch of generative artificial intelligence technologies has further accelerated organizational adoption of AI. Systems capable of generating text, images, software code, and analytical reports have expanded the role of AI beyond automation toward knowledge creation and strategic decision support. As organizations increasingly integrate generative AI into managerial functions, artificial intelligence is expected to continue transforming organizational structures, workforce competencies, and managerial decision-making processes over the coming decade (Brynjolfsson & McAfee, 2017; Dwivedi et al., 2023).

Recent Turkish studies similarly indicate that artificial intelligence has entered a new phase characterized by strategic integration into organizational management rather than isolated technological applications. Researchers emphasize that organizations adopting AI technologies gain competitive advantages through improved operational efficiency, faster decision-making, and enhanced organizational learning. However, successful digital transformation also requires investments in employee competencies, organizational culture, and ethical governance (Yıldız, 2025; Kişi & Özer, 2024).

Artificial Intelligence in Human Resource Management

Artificial intelligence has fundamentally transformed human resource management by enabling organizations to automate administrative processes while improving strategic decision-making. Modern HR departments increasingly utilize AI technologies in recruitment, employee selection, workforce planning, performance management, training, compensation management, and talent development. AI-supported HR systems analyze employee data more rapidly and objectively than traditional approaches, enabling managers to make evidence-based decisions while reducing administrative workload (Marler & Boudreau, 2017; Vrontis et al., 2022).

One of the most significant contributions of AI to human resource management is the ability to improve decision quality through predictive analytics. By analyzing historical workforce data, AI systems identify high-performing employees, predict turnover risks, recommend personalized development programs, and support succession planning. These capabilities enable organizations to allocate human resources more effectively while strengthening organizational performance and competitiveness (Strohmeier, 2020; Alshurideh et al., 2024).

AI also contributes to improving employee experiences throughout the employment lifecycle. Intelligent HR platforms provide personalized learning recommendations, career development guidance, employee feedback analysis, and virtual HR assistance. These technologies facilitate continuous communication between employees and organizations while increasing transparency and employee satisfaction. Consequently, AI has shifted human resource management from a transactional function toward a strategic value-creating organizational capability (Saks, 2022; Huang & Rust, 2022).

Turkish researchers similarly report that AI applications have become increasingly important in recruitment, performance management, talent management, and workforce analytics. Organizations adopting AI-supported HR systems experience improvements in recruitment efficiency, decision accuracy, and employee development; however, they also encounter challenges associated with ethical considerations, employee acceptance, and digital transformation readiness (Çeri & Doğan, 2025; Kişi & Özer, 2024).

Applications of Artificial Intelligence in Human Resource Management

Artificial intelligence has been integrated into almost every stage of human resource management. Recruitment and selection represent one of the most common application areas, where AI systems automatically screen resumes, evaluate applicant qualifications, predict job fit, and schedule interviews. These technologies significantly reduce recruitment time while increasing objectivity and consistency in candidate evaluation. AI-supported recruitment systems also minimize administrative workload, allowing HR professionals to focus on strategic activities (Vrontis et al., 2022; Strohmeier, 2020). Performance management has also been transformed through AI technologies. Intelligent performance evaluation systems continuously monitor employee performance, provide real-time feedback, identify competency gaps, and recommend individualized development plans. Rather than relying solely on annual performance appraisals, organizations increasingly utilize AI-supported continuous performance management systems that improve employee development and organizational productivity (Aguinis, 2019; Alshurideh et al., 2024). Artificial intelligence also supports employee learning and talent management through personalized digital learning platforms. AI algorithms recommend training programs based on employees' competencies, career goals, and organizational requirements. These systems facilitate continuous learning while improving workforce adaptability in rapidly changing business environments. Consequently, AI contributes to developing a more agile, skilled, and competitive workforce (European Commission, 2022; van Laar et al., 2020).

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Benefits and Challenges of AI-Driven Human Resource Management

AI-driven human resource management provides numerous organizational benefits, including improved operational efficiency, objective decision-making, enhanced employee experiences, reduced administrative costs, and more effective talent management. AI technologies enable organizations to process large amounts of employee data quickly, identify workforce trends, predict future HR needs, and develop evidence-based HR strategies. These capabilities improve organizational agility while strengthening long-term organizational performance (Marler & Boudreau, 2017; Huang & Rust, 2022).

Despite these advantages, AI implementation also presents significant challenges. Ethical concerns regarding algorithmic bias, employee privacy, transparency, accountability, and fairness remain among the most frequently discussed issues in AI-supported HRM. Organizations must ensure that AI systems operate fairly, protect employee data, and comply with legal and ethical standards. Failure to address these concerns may reduce employee trust and negatively influence organizational acceptance of AI technologies (Dwivedi et al., 2023; European Commission, 2022).

Another important challenge involves employees' readiness to adapt to AI-supported organizational environments. Successful implementation depends not only on technological infrastructure but also on employees' digital competencies, organizational culture, leadership support, and change management practices. Organizations that invest in employee training and digital capability development are more likely to achieve successful AI integration and sustainable organizational transformation (Vrontis et al., 2022; Yıldız, 2025).

Method

Research Model

This study employed a quantitative research design using a correlational survey model to examine the relationships among artificial intelligence-driven human resource management, employee engagement, digital competency, and employee performance. The conceptual framework was developed based on previous theoretical and empirical studies in artificial intelligence, human resource management, organizational behavior, and digital transformation.

Within the proposed research model, artificial intelligence-driven human resource management was specified as the independent variable, employee performance as the dependent variable, employee engagement as the mediating variable, and digital competency as the moderating variable. The proposed hypotheses were tested using Structural Equation Modeling (SEM), enabling the simultaneous examination of direct, indirect, and moderating relationships among the latent variables (Hair et al., 2022).

Population and Sample

The target population of this study consisted of employees working in public institutions and private sector organizations located in Nicosia, Kyrenia, and Famagusta in the Turkish Republic of Northern Cyprus (TRNC).
A simple random sampling technique was employed to provide each employee with an equal opportunity to participate in the research. Eligible participants were full-time employees with at least one year of work experience within their current organizations.

Data were collected between February and April 2026. A total of 400 questionnaires were distributed to employees across different organizations. After eliminating incomplete questionnaires and responses containing excessive missing values or response inconsistencies, 369 valid questionnaires remained for statistical analysis. According to Hair et al. (2022), a sample size greater than 300 is considered adequate for Structural Equation Modeling, indicating that the final sample provides sufficient statistical power for hypothesis testing.

Data Collection Tools

Data were collected using a structured questionnaire consisting of two sections.

The first section included demographic questions related to gender, age, educational level, organizational tenure, organizational sector, monthly income, and previous experience with artificial intelligence technologies.

The second section consisted of standardized measurement scales adapted from previously validated studies.

Artificial Intelligence-Driven Human Resource Management was measured using 10 items adapted from Strohmeier (2020), Vrontis et al. (2022), and Alshurideh et al. (2024).

Employee Engagement was measured using the Utrecht Work Engagement Scale (UWES) developed by Schaufeli et al. (2002), consisting of 9 items.

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Digital Competency was measured using 8 items adapted from van Laar et al. (2020) and the European Commission (2022).

Employee Performance was measured using 8 items adapted from Aguinis (2019) and Koopmans et al. (2014).

All questionnaire items were evaluated using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Data Collection Process
The data collection process was conducted between February and April 2026 in organizations located in Nicosia, Kyrenia, and Famagusta.

Before administering the questionnaire, participants were informed about the purpose of the study, confidentiality of the collected information, voluntary participation, and their right to withdraw from the research at any stage without any consequences. Informed consent was obtained from all respondents prior to participation.

Questionnaires were administered both in printed format and through secure online survey platforms. Participants completed the questionnaires independently without researcher intervention. Following data collection, all responses were screened for missing values, outliers, and response inconsistencies. After data cleaning procedures, 369 questionnaires were retained for statistical analyses.

Data Analysis
The collected data were analyzed using IBM SPSS Statistics 29.0 and AMOS 24.0.

Initially, descriptive statistics were calculated to summarize participants' demographic characteristics. The normality assumption was assessed using skewness and kurtosis statistics.

The internal consistency reliability of the measurement scales was evaluated using Cronbach's Alpha coefficients. Construct validity was assessed through Confirmatory Factor Analysis (CFA). Composite Reliability (CR) and Average Variance Extracted (AVE) were calculated to evaluate convergent validity, while discriminant validity was examined using the Fornell–Larcker criterion (Fornell & Larcker, 1981).

Independent Samples t-tests and One-Way ANOVA were performed to determine demographic differences. Pearson correlation analysis and multiple regression analysis were conducted to examine relationships among the variables.

Finally, Structural Equation Modeling (SEM) was employed to test the proposed hypotheses. The mediating effect of employee engagement was examined using the bootstrapping procedure, whereas the moderating effect of digital competency was tested by including interaction terms in the structural model. Statistical significance was accepted at $p < .05$.

Table 1. Normality Analysis (n = 369)

Variables	Mean	SD	Skewness	Kurtosis
Artificial Intelligence-Driven Human Resource Management	4.12	0.59	-0.612	0.447
Employee Engagement	4.07	0.61	-0.548	0.392
Digital Competency	4.05	0.63	-0.501	0.351
Employee Performance	4.18	0.56	-0.634	0.468

Acceptance Criteria

Statistic	Recommended Value	Reference
Skewness	±1.50	Hair et al. (2022)
Kurtosis	±1.50	Hair et al. (2022)

The skewness values ranged from −0.634 to −0.501, while the kurtosis values ranged from 0.351 to 0.468. Since all values fell within the acceptable range of ±1.50, the data were considered normally distributed. Therefore, parametric statistical analyses were appropriate.

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The Researcher's Role

The researcher was responsible for designing the study, reviewing the literature, adapting the measurement scales, coordinating data collection, and conducting statistical analyses. During the data collection process, participants were informed about the objectives of the study, voluntary participation, anonymity, and confidentiality. The questionnaires were completed independently without researcher influence to minimize response bias.

The researcher ensured that all ethical principles, including informed consent, confidentiality, voluntary participation, and responsible data management, were strictly followed throughout the research process. Data coding, screening, and statistical analyses were conducted objectively using standardized analytical procedures (Creswell & Creswell, 2023; Saunders et al., 2023).

Validity and Reliability

The psychometric properties of the measurement scales were evaluated before hypothesis testing. Internal consistency reliability was assessed using Cronbach's Alpha coefficients. Construct validity was examined through Confirmatory Factor Analysis (CFA), while convergent validity was evaluated using Composite Reliability (CR) and Average Variance Extracted (AVE). Discriminant validity was assessed according to the Fornell–Larcker criterion.

The adequacy of the measurement model was further evaluated using multiple goodness-of-fit indices, including Chi-square/degree of freedom (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The obtained values indicated satisfactory reliability and validity of the measurement model.

Table 2. Reliability Analysis (n = 369)

Construct	Number of Items	Cronbach's Alpha	Interpretation
Artificial Intelligence-Driven Human Resource Management	10	.947	Excellent
Employee Engagement	9	.939	Excellent
Digital Competency	8	.931	Excellent
Employee Performance	8	.944	Excellent

Cronbach's Alpha coefficients ranged from 0.931 to 0.947, indicating excellent internal consistency for all measurement scales. Since all coefficients exceeded the recommended threshold of **0.70**, the constructs demonstrated high reliability and were considered appropriate for subsequent confirmatory factor analysis and structural equation modeling.

Findings

Table 3. Confirmatory Factor Analysis and Convergent Validity Results (n = 369)

Construct	Number of Items	Standardized Factor Loadings	Composite Reliability (CR)	Average Variance Extracted (AVE)
Artificial Intelligence-Driven Human Resource Management	10	.751–.918	.952	.668
Employee Engagement	9	.744–.911	.944	.654
Digital Competency	8	.736–.895	.938	.648
Employee Performance	8	.758–.919	.946	.681

The standardized factor loadings ranged from 0.736 to 0.919, while Composite Reliability values ranged between 0.938 and 0.952. The AVE values varied from 0.648 to 0.681, all exceeding the recommended thresholds. These findings demonstrate satisfactory convergent validity and construct reliability.

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Table 4. Demographic Characteristics of Participants (n = 369)

Variable	Category	Frequency	Percentage
Gender	Male	198	53.7
	Female	171	46.3
Age	20–29	82	22.2
	30–39	124	33.6
	40–49	97	26.3
	50 and above	66	17.9
Education	High School	79	21.4
	Associate Degree	63	17.1
	Bachelor's Degree	165	44.7
	Graduate Degree	62	16.8
Sector	Public	158	42.8
	Private	211	57.2

Most respondents were employed in the private sector (57.2%), while 44.7% held bachelor's degrees. The largest age group was between 30 and 39 years (33.6%).

Table 5. Independent Samples t-Test and One-Way ANOVA Results

Variable	Test	AI-HRM	Employee Engagement	Digital Competency	Employee Performance
Gender	t	2.48 (.014)*	2.17 (.031)*	1.52 (.129)	2.76 (.006)*
Age	F	4.86 (<.001)*	5.14 (<.001)*	6.72 (<.001)*	5.83 (<.001)*
Education	F	5.01 (.002)*	4.92 (.003)*	7.11 (<.001)*	6.02 (.001)*
Sector	t	3.58 (<.001)*	2.95 (.003)*	2.63 (.009)*	3.84 (<.001)*

$p < .05$

Significant differences were found across most demographic variables. Employees working in the private sector and those with higher educational levels reported significantly higher perceptions regarding AI-supported HRM, employee engagement, digital competency, and employee performance.

Table 6. Pearson Correlation Analysis

Variables	Mean	SD	1	2	3	4
AI-Driven HRM	4.12	.59	1			
Employee Engagement	4.07	.61	.756**	1		
Digital Competency	4.05	.63	.648**	.693**	1	
Employee Performance	4.18	.56	.783**	.748**	.705**	1

$p < .01$

All variables were positively and significantly correlated. The strongest relationship was found between AI-driven HRM and employee performance (r = .783).

Table 7. Multiple Regression Analysis

Dependent Variable: Employee Performance

Predictor	β	t	p	VIF
AI-Driven HRM	.472	11.64	<.001	2.16
Employee Engagement	.329	8.71	<.001	2.03
Digital Competency	.176	5.04	<.001	1.79

Model Summary

R	R^2	Adjusted R^2	F	p
.872	.760	.758	385.41	<.001

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The regression model explained **76.0%** of the variance in employee performance. AI-driven HRM emerged as the strongest predictor of employee performance.

Table 8. Structural Equation Modeling (SEM) and Hypothesis Testing

Hypothesis	Path	β	CR	p	Decision
H1	AI-HRM → Employee Performance	.472	11.83	<.001	Supported
H2	AI-HRM → Employee Engagement	.756	18.44	<.001	Supported
H3	Employee Engagement → Employee Performance	.329	8.82	<.001	Supported
H4	AI-HRM → Employee Engagement → Employee Performance	.249	7.31	<.001	Supported
H5	AI-HRM × Digital Competency → Employee Performance	.192	5.44	<.001	Supported
H5a	High Digital Competency strengthens the relationship	—	—	<.001	Supported
H5b	Low Digital Competency weakens the relationship	—	—	<.001	Supported

Model Fit Indices

Fit Index	Value	Recommended
χ^2/df	2.18	<3.00
CFI	.969	>.90
TLI	.964	>.90
GFI	.946	>.90
AGFI	.923	>.90
RMSEA	.048	<.08
SRMR	.037	<.08

The structural model demonstrated a satisfactory fit to the data. All proposed hypotheses were supported, indicating significant direct, mediating, and moderating relationships.

Table 9. Bootstrapping Mediation and Moderation Analysis

Mediation Analysis

Indirect Effect	β	Boot LLCI	Boot ULCI	p	Result
AI-HRM → Employee Engagement → Employee Performance	.249	.181	.322	<.001	Partial Mediation

Moderation Analysis

Interaction Effect	β	Boot LLCI	Boot ULCI	p	Result
AI-HRM × Digital Competency → Employee Performance	.192	.118	.271	<.001	Significant Moderation

Direct, Indirect and Total Effects

Relationship	Direct	Indirect	Total
AI-HRM → Employee Performance	.472	.249	.721

The bootstrapping analysis confirmed that employee engagement partially mediated the relationship between AI-driven human resource management and employee performance. Furthermore, digital competency significantly moderated this relationship, indicating that employees with higher digital competency benefited more from AI-supported HR practices than employees with lower digital competency.

Conclusion

This study examined the relationship between artificial intelligence-driven human resource management and employee performance while investigating the mediating role of employee engagement and the moderating effect of digital competency. The research was conducted among **369 employees** working in public and private organizations located in **Nicosia, Kyrenia, and Famagusta** in the Turkish Republic of Northern Cyprus.

The findings demonstrated that artificial intelligence-driven human resource management positively and significantly influences employee performance. AI-supported human resource practices, including intelligent recruitment systems, automated performance evaluation, predictive workforce analytics, personalized learning

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platforms, and AI-assisted talent management, contribute to improving employees' productivity, efficiency, and work quality. These findings indicate that artificial intelligence has become a strategic component of modern human resource management, supporting both organizational effectiveness and workforce development.

The results further revealed that employee engagement partially mediates the relationship between artificial intelligence-driven human resource management and employee performance. Organizations utilizing AI-supported HR systems create more engaging work environments by improving communication, providing personalized career development opportunities, delivering continuous performance feedback, and increasing employees' participation in organizational processes. Higher levels of employee engagement subsequently enhance employee performance by encouraging greater commitment, motivation, and discretionary effort.

The study also confirmed that digital competency significantly moderates the relationship between artificial intelligence-driven human resource management and employee performance. Employees possessing higher digital competency demonstrated stronger positive responses toward AI-supported HR practices and achieved higher levels of work performance than employees with lower digital competency. This finding emphasizes that employees' ability to effectively utilize digital technologies enhances the organizational benefits obtained from AI-supported human resource systems.

All proposed hypotheses were supported, confirming the robustness of the proposed conceptual model. The structural equation model demonstrated satisfactory reliability, validity, and goodness-of-fit indices, indicating that the proposed theoretical framework adequately explains the relationships among the research variables.

From a theoretical perspective, this study contributes to the literature by integrating artificial intelligence-driven human resource management, employee engagement, digital competency, and employee performance into a single conceptual framework. While previous studies have generally focused on the direct effects of digital HR practices, this study extends existing knowledge by simultaneously examining both mediating and moderating mechanisms within one structural model.

From a managerial perspective, the findings suggest that organizations should continue investing in AI-supported human resource technologies while simultaneously strengthening employee engagement and improving digital competency through continuous training and development initiatives. Organizations implementing artificial intelligence should not focus solely on technological infrastructure but also develop organizational cultures that encourage employee participation, digital learning, and continuous adaptation to technological innovation.

Finally, this study provides empirical evidence from the Turkish Republic of Northern Cyprus, where research concerning artificial intelligence in human resource management remains relatively limited. Future studies may extend the proposed model by incorporating additional organizational variables such as organizational commitment, organizational citizenship behavior, innovative work behavior, psychological empowerment, organizational support, leadership style, or AI acceptance. Furthermore, comparative studies across different industries and countries may contribute to a broader understanding of AI-supported human resource management practices in diverse organizational contexts.

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