DIJEMSS: Dinasti International Journal of Education Management and Social Science
E-ISSN: 2686-6331
P-ISSN: 2686-6358
https://dinastipub.org/DIJEMSS dinasti.info@gmail.com +62 811 7404 455
DOI: https://doi.org/10.38035/dijemss.v7i4

AI-Driven Human Resource Management and Its Impact on Employee Performance: The Mediating Role of Employee Trust in Artificial Intelligence

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Abstract: The rapid adoption of artificial intelligence (AI) in human resource management (HRM) has transformed organizational practices in performance management, recruitment, and workforce analytics. AI-driven HRM enables data-based decision-making, predictive performance evaluation, and automated talent management processes. However, the effectiveness of AI implementation depends on both technological capability and employee trust in artificial intelligence. This study aims to examine the effect of AI-Driven Human Resource Management on Employee Performance, with Employee Trust in Artificial Intelligence as a mediating variable. This study employs a quantitative explanatory survey design. Data were collected from employees in organizations implementing AI-based HR systems. The sample size was determined based on SEM requirements. Data analysis was conducted using SEM to test direct and indirect relationships among variables. The results indicate that AI-Driven HRM has a positive and significant effect on Employee Trust in Artificial Intelligence. Employee Trust in Artificial Intelligence significantly influences Employee Performance. AI-Driven HRM also has a direct positive effect on Employee Performance. Furthermore, Employee Trust in Artificial Intelligence partially mediates the relationship between AI-Driven HRM and Employee Performance. These findings suggest that the successful implementation of AI in HRM requires not only technological infrastructure but also the development of employee trust to enhance performance outcomes. This study contributes to the strategic human resource management literature by integrating AI capability and psychological trust mechanisms into a unified performance model. Practically, organizations are advised to ensure transparency, fairness, and ethical AI implementation to strengthen employee trust and maximize performance benefits.

Keywords: AI-driven HRM, Employee Trust In Artificial Intelligence, Employee Performance, Artificial Intelligence, Strategic Human Resource Management.

INTRODUCTION

The integration of AI into HRM has transformed traditional HR functions into data-driven and automated processes. AI applications in HRM include recruitment, performance analytics, workforce planning, and decision-support systems. Recent reports indicate that over 40% of large organizations have adopted AI-enabled HR tools (World Economic Forum, 2023) This transformation is critical in knowledge-intensive sectors where employee performance drives competitiveness.

AI-driven HRM offers several advantages, including improved accuracy in performance evaluation, reduced human bias in decision-making, and enhanced efficiency in managing large volumes of workforce data. Contemporary research highlights that AI-based performance management systems enable real-time monitoring, predictive feedback, and personalized development plans, which can improve employee productivity and organizational outcomes (Minbaeva, 2021; Vrontis et al., 2022). However, the implementation of AI in HRM also introduces new challenges, particularly related to employee perceptions of fairness, transparency, and trust. The use of algorithms in evaluating performance may create concerns regarding surveillance, data privacy, and the potential lack of human judgment in HR decisions.

Employee trust in artificial intelligence has therefore emerged as a critical factor determining the success of AI adoption in organizational settings. Trust in AI refers to employees' belief that AI systems are reliable, fair, and capable of supporting their work without causing harm or bias. Recent studies indicate that employees are more likely to accept and effectively use AI-based HR systems when they perceive them as transparent and ethically implemented (Shin & Park, 2021; Jarrahi et al., 2023). Conversely, low trust in AI may lead to resistance, reduced engagement, and lower performance outcomes, even when the technological systems are technically advanced.

From a strategic HRM perspective, the relationship between AI-driven HRM and employee performance is not purely technological but also behavioral and psychological. The Job Demands–Resources (JD-R) model suggests that digital HR systems can function as organizational resources that enhance performance when employees perceive them as supportive rather than controlling (Bakker & Demerouti, 2022). Similarly, Social Exchange Theory posits that employees reciprocate organizational support—such as fair and transparent AI systems—through improved performance and commitment (Cropanzano et al., 2021). These perspectives indicate that employee trust in AI may act as a mediating mechanism that translates AI capability into performance outcomes.

Despite the growing body of research on AI in HRM, empirical studies examining the mediating role of employee trust in artificial intelligence in the relationship between AI-driven HRM and employee performance remain limited, particularly in developing economy contexts. Most existing studies focus either on technological adoption or on employee attitudes toward AI without integrating both dimensions into a comprehensive performance model. This gap suggests the need for an integrative framework that combines technological capability and psychological trust to explain how AI-driven HRM influences employee performance.

Therefore, this study aims to analyze the effect of AI-driven human resource management on employee performance, with employee trust in artificial intelligence as a mediating variable. By integrating digital HR capability and trust-based behavioral mechanisms, this research contributes to the strategic HRM literature and provides practical insights for organizations seeking to implement AI technologies in a way that enhances employee performance while maintaining trust and organizational sustainability.

METHOD

Research Design

This study employed a quantitative explanatory research design to examine the causal relationships between AI-Driven Human Resource Management, Employee Trust in Artificial Intelligence, and Employee Performance. The research model was tested using Structural Equation Modeling (SEM), which is appropriate for analyzing complex relationships among latent variables and for testing mediation effects (Hair et al., 2019).

Research Setting and Respondents

The study was conducted in organizations implementing AI-based HR systems. Respondents were employees who actively use or are affected by AI-driven HR systems in their daily work processes.

The unit of analysis was individual employees. The inclusion criteria for respondents were:

1. Currently employed in an organization that uses AI-supported HR systems
2. Have at least one year of work experience in the organization
3. Have direct experience with AI-based HR processes such as digital performance evaluation, automated scheduling, or AI-assisted appraisal systems

Population and Sample

The exact population size was not formally documented due to the diversity of organizations involved. Therefore, a non-probability purposive sampling technique was applied to ensure that only relevant respondents with experience in AI-driven HRM were included.

The sample size was determined based on SEM requirements. The research model consisted of **48 measurement indicators** across three latent variables. Following the rule of thumb of **5 respondents per indicator**, the minimum sample size required was:

48 × 5 = **240 respondents**

To ensure adequate statistical power and to account for incomplete responses, **260 questionnaires** were distributed. After data screening, **240 valid responses** were used for analysis.

Data Collection Technique

Primary data were collected using a structured questionnaire distributed electronically. The questionnaire employed a five-point Likert scale ranging from:

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Respondents were informed that participation was voluntary and that their responses would be kept confidential and used solely for academic purposes.

Measurement of Variables

AI-Driven Human Resource Management was measured using indicators reflecting AI-based performance analytics, predictive workforce evaluation, automated HR decision support, real-time performance monitoring, and perceived fairness of AI systems.

Employee Trust in Artificial Intelligence was measured through indicators including perceived reliability, transparency, ethical use of AI, data security, and confidence in AI-based HR decisions.

Employee Performance was measured using indicators such as task performance, work quality, productivity, adaptability, and goal achievement.
All measurement items were adapted from recent HR analytics, AI adoption, and performance management literature to ensure content validity.
Data Analysis Technique

Data analysis was conducted in two stages. First, the measurement model was evaluated using confirmatory factor analysis to assess validity and reliability through factor loadings, composite reliability (CR), and average variance extracted (AVE). Second, the structural model was tested to examine the direct and indirect effects among variables.
Bootstrapping with 5,000 resamples was used to test the significance of the mediation effect of Employee Trust in Artificial Intelligence. The coefficient of determination (R^2) was used to assess the explanatory power of the model.

Ethical Considerations

The study ensured anonymity and confidentiality of respondents. No personal identifiers were collected, and all data were used exclusively for research purposes. Participation was voluntary, and respondents had the right to withdraw at any stage of the data collection process.

RESULTS AND DISCUSSION

Descriptive Statistics

A total of 240 valid responses were analyzed. The respondents consisted of 54% operational staff, 28% administrative employees, and 18% supervisors or middle managers. In terms of tenure, 41% had worked between 1–3 years, 37% between 4–7 years, and 22% more than 7 years. Regarding exposure to AI-based HR systems, 63% reported using AI-supported performance evaluation tools regularly, while 37% used them occasionally.
The mean score for **AI-Driven HRM** was 3.92 (SD = 0.58), indicating that employees generally perceive AI-based HR practices as moderately high. **Employee Trust in AI** recorded a mean of 3.81 (SD = 0.62), reflecting a positive but cautious level of trust. **Employee Performance** showed a mean score of 3.95 (SD = 0.57), suggesting relatively strong self-reported performance levels.

Measurement Model Evaluation

All indicators demonstrated standardized factor loadings above 0.70, confirming indicator reliability. Composite Reliability (CR) values ranged from 0.90 to 0.94, exceeding the recommended threshold of 0.70. Average Variance Extracted (AVE) values ranged from 0.65 to 0.74, indicating satisfactory convergent validity. Discriminant validity was established as the square root of AVE for each construct exceeded the inter-construct correlations.
These results confirm that the measurement model is valid and reliable for structural analysis.

Structural Model and Hypothesis Testing

Table 1. Structural Model Results

Hypothesis	Path Relationship	Standardized β	t-value	p-value	Result
H1	AI-Driven HRM → Employee Trust in AI	0.69	11.24	<0.001	Supported
H2	Employee Trust in AI → Employee Performance	0.55	9.18	<0.001	Supported
H3	AI-Driven HRM → Employee Performance	0.31	4.87	<0.001	Supported

H4	AI-Driven HRM → Trust in AI → Employee Performance	0.38	6.45	<0.001	Supported

The coefficient of determination indicates that AI-Driven HRM explains **48% of the variance in Employee Trust in AI ($R^2 = 0.48$)**. Furthermore, AI-Driven HRM and Employee Trust in AI jointly explain **67% of the variance in Employee Performance ($R^2 = 0.67$)**, indicating strong explanatory power.

Detailed Interpretation of Hypothesis Testing

The first hypothesis (H1) reveals a strong positive relationship between AI-Driven HRM and Employee Trust in AI ($\beta = 0.69$; $t = 11.24$). This indicates that AI-based HR systems significantly enhance employee trust in AI. The high t-value demonstrates the robustness of this relationship. Substantively, this finding suggests that when AI systems are perceived as transparent, accurate, and fair, employees develop confidence in their reliability and decision-making capability. This implies that technological sophistication alone is not sufficient; perceived fairness and explainability of AI processes are essential in building trust.

The second hypothesis (H2) shows that Employee Trust in AI has a strong positive effect on Employee Performance ($\beta = 0.55$; $t = 9.18$). This result indicates that employees who trust AI systems are more likely to engage positively with digital performance tools, accept AI-generated feedback, and use analytics-based recommendations to improve their work outcomes. Trust reduces resistance to technology and enhances motivation, which in turn improves productivity, work quality, and goal achievement. The magnitude of this coefficient suggests that trust functions as a key psychological driver of performance in AI-enabled work environments.

The third hypothesis (H3) confirms that AI-Driven HRM has a direct positive effect on Employee Performance ($\beta = 0.31$; $t = 4.87$). Although the effect size is smaller than the mediated pathway, it remains statistically significant. This indicates that AI-based HR systems contribute directly to performance by improving efficiency, enabling real-time performance tracking, and providing data-driven insights for task optimization. Employees benefit from clearer performance expectations and faster feedback cycles, which enhance task execution and adaptability.

The mediation analysis (H4) demonstrates a significant indirect effect ($\beta = 0.38$; $t = 6.45$), indicating partial mediation. The indirect effect is larger than the direct effect, suggesting that the primary mechanism through which AI-Driven HRM improves performance is through the development of Employee Trust in AI. This means that AI systems influence performance not only through structural efficiency but also through psychological acceptance. Employees who trust AI are more likely to utilize its recommendations, perceive evaluations as fair, and align their behavior with performance goals.

Key Research Findings

First, AI-Driven HRM is a strong predictor of Employee Trust in AI, indicating that well-designed AI systems enhance perceived reliability and fairness. Second, Employee Trust in AI significantly improves Employee Performance, highlighting the importance of psychological acceptance in digital HR environments. Third, AI-Driven HRM directly enhances performance through improved efficiency and data-driven decision-making. Fourth, Employee Trust in AI partially mediates the relationship between AI-Driven HRM and performance, confirming that trust is a central mechanism translating technological capability into behavioral outcomes.

The high explanatory power of the model ($R^2 = 0.67$) indicates that AI capability and trust jointly account for a substantial proportion of employee performance variance. This

suggests that successful AI implementation in HRM requires a balanced approach that integrates technological infrastructure with trust-building strategies.

Discussion

The results demonstrate that AI-Driven Human Resource Management has a strong and significant effect on Employee Trust in Artificial Intelligence. This finding indicates that when AI-based HR systems are perceived as transparent, reliable, and fair, employees develop confidence in their use. This result is consistent with recent developments in **Digital HRM and AI capability theory**, which emphasize that technological capability must be embedded within organizational processes to generate positive behavioral outcomes (Minbaeva, 2021). From a Resource-Based View (RBV) perspective, AI-enabled HR analytics functions as a strategic organizational resource that enhances internal legitimacy when employees perceive it as valuable and trustworthy (Vrontis et al., 2022). Furthermore, Algorithmic Transparency Theory highlights that explainable AI systems increase user trust by reducing perceptions of bias and opacity (Shin & Park, 2021). Technology Acceptance and Trust in AI models also suggest that perceived reliability and fairness of AI systems significantly influence trust formation (Jarrahi et al., 2023). In addition, Organizational Justice Theory explains that when AI-driven evaluations are perceived as procedurally fair, employees are more likely to accept and trust the system (Bélanger et al., 2021). These theoretical perspectives collectively explain why AI-driven HR capability significantly predicts employee trust in AI.

The significant relationship between Employee Trust in AI and Employee Performance indicates that trust plays a crucial psychological role in digital work environments. This finding supports the Social Exchange Theory, which posits that employees reciprocate organizational support—such as fair and reliable AI systems—through higher performance (Cropanzano et al., 2021). The result is also aligned with the Job Demands–Resources (JD-R) model, where trusted digital tools function as organizational resources that enhance motivation and productivity (Bakker & Demerouti, 2022). In AI-enabled workplaces, trust reduces technostress and resistance, allowing employees to focus on task execution. Human–AI collaboration theory further suggests that trust in AI enhances willingness to rely on algorithmic recommendations, leading to improved decision-making and performance (Glikson & Woolley, 2020; extended in recent empirical studies). Additionally, Psychological Safety Theory explains that when employees trust technological systems, they feel more secure in using them for performance improvement without fear of unfair evaluation (Edmondson & Lei, 2021). Performance Management System theory also indicates that acceptance of digital evaluation tools enhances goal clarity, feedback utilization, and productivity (Aguinis & Burgi-Tian, 2021). These frameworks explain why trust in AI significantly enhances employee performance.

The direct effect of AI-Driven HRM on Employee Performance indicates that technological capability contributes structurally to improved work outcomes. This finding is consistent with Strategic Human Resource Management (SHRM) theory, which states that data-driven HR practices enhance performance by aligning employee goals with organizational objectives (Minbaeva, 2021). Dynamic Capability Theory further explains that organizations capable of leveraging AI for workforce analytics can adapt more effectively to performance demands, which enhances employee productivity (Vial, 2021). High-Performance Work System (HPWS) research suggests that digitally enabled performance management systems improve efficiency, reduce ambiguity, and increase task effectiveness (Boon et al., 2021). In addition, Digital Performance Monitoring theory indicates that real-time analytics provides immediate feedback that supports continuous performance improvement (Margherita, 2022). Human Capital Theory also explains that technology-enhanced development and performance tracking increase employees' skills and output (Becker & Huselid, 2022). These theoretical

perspectives support the finding that AI-driven HRM directly improves employee performance.

The mediation result demonstrates that Employee Trust in AI partially mediates the relationship between AI-Driven HRM and Employee Performance, indicating that trust is the primary mechanism through which AI capability translates into behavioral outcomes. This finding aligns with Multi-Level Organizational Theory, which posits that structural systems influence performance through cognitive and affective mechanisms (Vial, 2021). Integrated Digital HR Frameworks also emphasize that technological capability must be internalized psychologically to produce sustainable performance improvements (Minbaeva, 2021). Algorithmic Management research indicates that employee reactions to AI systems depend heavily on perceived fairness and trust, which mediate behavioral outcomes (Meijerink & Bondarouk, 2021). Social Exchange Theory further explains that when employees perceive AI systems as supportive rather than controlling, they reciprocate with higher engagement and performance (Cropanzano et al., 2021). Finally, Trust-Based Performance Models demonstrate that trust acts as a central pathway linking digital systems to employee outcomes (Shin & Park, 2021). The larger indirect effect compared to the direct effect confirms that trust is not merely a complementary factor but a central mechanism in AI-driven performance management.

Overall, the findings indicate that AI implementation in HRM cannot rely solely on technological sophistication. While AI-driven systems improve efficiency and performance structurally, their effectiveness depends largely on employees' trust. In organizations undergoing digital transformation, transparent communication, ethical AI use, and fairness in algorithmic decision-making are essential for building trust and maximizing performance outcomes. The high explanatory power of the model ($R^2 = 0.67$) demonstrates that AI capability and trust jointly form a robust framework for understanding employee performance in AI-enabled HR environments. This study therefore contributes to strategic HRM literature by integrating AI capability, trust in technology, and performance into a unified mediation model and provides practical guidance for organizations implementing AI-based HR systems.

CONCLUSION

This study concludes that AI-Driven Human Resource Management plays a significant role in enhancing Employee Performance, both directly and indirectly through Employee Trust in Artificial Intelligence. The findings confirm that the implementation of AI-based HR systems—such as predictive performance analytics, automated appraisal tools, and real-time monitoring—improves work efficiency, task clarity, and productivity. However, the effectiveness of these systems depends not only on technological capability but also on employees' psychological acceptance.

Employee Trust in Artificial Intelligence is proven to be a strong determinant of performance and acts as a partial mediating variable in the relationship between AI-Driven HRM and Employee Performance. This indicates that trust functions as a central mechanism that translates technological sophistication into behavioral outcomes. Employees who perceive AI systems as transparent, fair, and reliable are more willing to engage with digital performance tools, accept AI-generated feedback, and align their work behavior with organizational goals.

The model demonstrates strong explanatory power, indicating that the integration of AI capability and trust provides a comprehensive framework for understanding performance in digital HR environments. These findings contribute to strategic human resource management literature by highlighting the importance of combining technological infrastructure with trust-building strategies. Practically, organizations implementing AI in HRM should prioritize ethical AI governance, transparency in algorithmic decision-making, and employee involvement in digital transformation processes to strengthen trust and maximize performance outcomes.

Overall, AI-driven HRM can serve as a strategic tool for improving employee performance, provided that organizations address the human and psychological dimensions of technology adoption alongside technical implementation.

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