

Artificial Intelligence and Employee Engagement: Evidence from Digital HR Practices

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ABSTRACT

The digital transformation of human resource management has accelerated the adoption of artificial intelligence (AI) across various HR practices, including recruitment, performance appraisal, and employee development. While AI has been widely recognized for improving efficiency and accuracy in HR processes, its implications for employees' psychological outcomes, particularly employee engagement, remain underexplored. This study aims to examine the influence of artificial intelligence in digital HR practices on employee engagement. A quantitative explanatory design was employed, involving employees who actively use AI-based digital HR systems. Data were collected through a structured questionnaire and analyzed using Structural Equation Modeling–Partial Least Squares (SEM–PLS). The results indicate that artificial intelligence embedded in digital HR practices has a positive and significant effect on employee engagement. These findings suggest that AI-driven HR systems that emphasize support, personalization, and transparency enhance employees' cognitive, emotional, and behavioral engagement. This study contributes theoretically to the digital HR literature by positioning AI as a strategic driver of employee engagement and provides practical insights for organizations seeking to implement human-centered AI in HR management.

Keywords: artificial intelligence; engagement; digitalHR; employees; technology

INTRODUCTION

The rapid digital transformation of human resource management has fundamentally reshaped how organizations manage, develop, and engage their workforce. In recent years, artificial intelligence (AI) has emerged as a central component of digital HR practices, enabling organizations to automate routine tasks, enhance decision-making accuracy, and personalize employee-related processes. AI-powered systems are increasingly deployed in recruitment and selection, performance appraisal, learning and development, workforce analytics, and employee support platforms, marking a significant shift from traditional HR models toward data-driven and intelligent HR ecosystems (Malik et al., 2022; Sundari et al., 2024).

Beyond operational efficiency, the integration of AI into HR practices has transformed the employee experience, particularly through continuous interaction between employees and digital HR systems. Employees now engage with AI-enabled platforms for performance feedback, training recommendations, career planning, and administrative services, making AI a visible and influential presence in daily work life. As a result, AI-driven HR systems no longer function merely as back-end managerial tools



but actively shape employees' perceptions, emotions, and behavioral responses toward their organization (Alzeiby et al., 2025; Gayathiri, 2025).

One critical psychological outcome potentially affected by AI-based HR practices is employee engagement. Employee engagement is commonly conceptualized as a multidimensional construct encompassing cognitive engagement (focused attention and absorption in work), emotional engagement (positive feelings toward work and organization), and behavioral engagement (discretionary effort and proactive behavior) (Rani et al., 2025). High levels of engagement have been consistently associated with improved performance, reduced turnover intention, and enhanced organizational sustainability. Consequently, understanding the determinants of employee engagement has become a strategic priority for organizations operating in increasingly digital and competitive environments.

In the context of digital HR, AI presents a paradoxical influence on employee engagement. On one hand, AI-driven HR practices can enhance engagement by reducing administrative workload, improving transparency, enabling personalized development pathways, and supporting fairer decision-making through data-based evaluations (Rožman et al., 2023; Kayusi et al., 2025). On the other hand, excessive automation, algorithmic decision-making, and perceived loss of human judgment may generate feelings of alienation, surveillance anxiety, or reduced autonomy among employees, potentially undermining engagement (Okatta et al., 2024; Patel, 2025). These contrasting possibilities suggest that the relationship between AI in HR and employee engagement is complex and warrants empirical investigation.

Existing academic literature has largely examined AI adoption in HR from the perspectives of process efficiency, strategic HRM, and organizational performance. Studies have demonstrated that AI enhances recruitment accuracy, optimizes talent management, and improves HR analytics capabilities (Chao et al., 2025; Sahu et al., 2025). However, empirical findings regarding AI's impact on employee engagement remain fragmented and inconclusive. Some studies report positive effects mediated by improved employee experience and perceived organizational support, while others highlight risks associated with depersonalization and reduced trust in AI-based systems (Malik et al., 2022; Mishra & Mishra, 2025).

Methodologically, many prior studies rely on linear regression or descriptive analysis, which limits their ability to capture the latent and multidimensional nature of both AI-based HR practices and employee engagement. Moreover, research often treats AI adoption as a binary or surface-level variable, rather than modeling it as a latent construct reflecting employees' perceptions, frequency of use, and experiential interaction with AI-driven HR systems. This methodological limitation constrains deeper theoretical understanding of how AI shapes employee engagement mechanisms (Chinnaraju, 2025; Gupta & Jaiswal, 2025).

From the perspective of the Job Demands–Resources (JD–R) theory, artificial intelligence embedded in digital HR practices can be conceptualized as a form of *job resource* that reduces routine job demands while increasing access to informational, developmental, and decision-support resources. AI reduces administrative burdens, enhances transparency, and provides personalized feedback, allowing employees to allocate more cognitive and emotional energy to meaningful work tasks. This mechanism explains how AI-based HR systems may foster employee engagement through the improvement of work resources rather than merely through technological efficiency (Rožman et al., 2023; Malik et al., 2022; Sahu et al., 2025).

From a contextual perspective, empirical evidence remains scarce in organizations that have intensively adopted digital HR ecosystems, where AI is embedded across

multiple HR functions rather than applied selectively. Employees in such environments interact with AI continuously, making them an appropriate population for examining the psychological and behavioral consequences of AI-based HR practices. Without empirical evidence from these contexts, managerial decisions regarding AI implementation risk prioritizing technological efficiency at the expense of employee engagement and well-being.

Accordingly, a clear research gap emerges in the limited availability of quantitative explanatory studies that model the structural relationship between artificial intelligence in digital HR practices and employee engagement using advanced analytical techniques. Specifically, there is a lack of studies employing Structural Equation Modeling with Partial Least Squares (SEM-PLS) to examine this relationship as a system of latent constructs. SEM-PLS is particularly suitable for this research context, as it allows simultaneous testing of complex relationships, accommodates non-normal data, and emphasizes predictive relevance, an essential consideration in emerging AI-driven organizational research (Chinnaraju, 2025).

This study seeks to address these gaps by empirically examining the influence of artificial intelligence embedded in digital HR practices on employee engagement. By conceptualizing AI-based HR practices and employee engagement as latent constructs and analyzing their relationship using SEM-PLS, this research aims to provide a more nuanced and robust understanding of how AI reshapes employee engagement in contemporary organizations.

The findings of this study are expected to contribute theoretically to the literature on digital HRM, employee engagement, and AI-enabled organizations by clarifying the engagement-related implications of AI adoption. Practically, the results offer evidence-based insights for managers and HR professionals in designing human-centered AI strategies that balance technological efficiency with employees' psychological and behavioral needs. Ultimately, this research responds to growing calls for responsible and employee-oriented implementation of AI in human resource management.

METHOD

Research Design

This study employed a quantitative explanatory research design to examine the causal relationship between the use of artificial intelligence in digital human resource practices and employee engagement. The explanatory approach was selected to test theoretically grounded relationships among latent constructs rather than merely describing patterns. Data were collected through a cross-sectional survey and analyzed using Structural Equation Modeling with the Partial Least Squares approach (SEM-PLS).

SEM-PLS was chosen due to its suitability for predictive research, its ability to model latent constructs with multiple indicators, and its robustness when dealing with non-normal data distributions and moderate sample sizes. This approach is widely recommended for studies examining emerging technologies such as artificial intelligence in organizational contexts (Chinnaraju, 2025; Gupta & Jaiswal, 2025).

Population and Sample

The research population consisted of employees working in organizations that have implemented AI-based digital HR systems, including AI-supported recruitment tools, performance management platforms, learning and development systems, and HR analytics applications. Respondents included both operational employees and HR-related staff who regularly interact with digital HR systems in their daily work activities. A non-probability purposive sampling technique was applied, with inclusion criteria requiring respondents to (1) actively use AI-enabled HR systems and (2) have at least six months

of experience working under digital HR practices. Based on SEM–PLS sample adequacy principles, specifically the “ten-times rule” and recommendations for stable path estimation, a total of 230 valid responses were analyzed, which exceeded the minimum sample requirement and ensured sufficient statistical power.

Research Instruments

Data were collected using a structured questionnaire with items measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was developed based on prior empirical studies and adapted to the context of AI-driven digital HR practices. The Artificial Intelligence in Digital HR Practices construct was measured using six reflective indicators capturing employees’ perceptions of AI usage in HR processes, including automation of HR services, accuracy of AI-based decisions, personalization of HR systems, transparency of AI recommendations, ease of system interaction, and perceived usefulness of AI-supported HR tools. The Employee Engagement construct was measured using nine reflective indicators representing three dimensions: cognitive engagement (focus and absorption at work), emotional engagement (enthusiasm and positive feelings toward work), and behavioral engagement (extra-role effort and proactive contribution).

Data Analysis Procedure

Data analysis followed a two-stage SEM–PLS procedure using SmartPLS software. First, the measurement model (outer model) was evaluated to assess indicator reliability, internal consistency reliability, and convergent validity. Second, the structural model (inner model) was assessed to examine the explanatory power of the model, the strength and direction of relationships, and hypothesis testing through bootstrapping with 5,000 subsamples.

To mitigate potential self-report bias and common method variance (CMV), several procedural and statistical remedies were applied. Procedurally, respondents were assured of anonymity and confidentiality to reduce social desirability bias. Statistically, Harman’s single-factor test was conducted, and the first factor did not account for the majority of variance, indicating that CMV was unlikely to threaten the validity of the findings. Variance Inflation Factor (VIF) values were also examined to ensure the absence of multicollinearity. In addition, demographic variables such as age, tenure, and job position were tested as control variables in the structural model to ensure that the relationship between AI-based HR practices and employee engagement was not confounded by respondent characteristics (Chinnaraju, 2025; Gupta & Jaiswal, 2025).

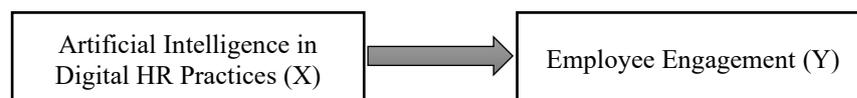


Figure 1. Diagram Conceptual Research

RESULT AND DISCUSSION

Respondent Characteristics

Of the 230 respondents, the majority were between 25 and 35 years old (54.8%), with an average organizational tenure of 4.2 years. Approximately 61.3% were operational employees, while 38.7% held HR-related or supervisory roles. Most respondents reported frequent interaction with AI-enabled HR systems, particularly in performance evaluation, learning platforms, and administrative HR services. These characteristics indicate that respondents were adequately exposed to AI-based digital HR practices, supporting the relevance of the dataset for hypothesis testing.

**Measurement Model Evaluation (Outer Model)
Indicator Reliability and Convergent Validity**

All indicators demonstrated satisfactory outer loading values above the recommended threshold of 0.70. The Average Variance Extracted (AVE) values for all constructs exceeded 0.50, indicating adequate convergent validity.

Table 1. Measurement Model Assessment

Construct	Cronbach's Alpha	Composite Reliability	AVE
Artificial Intelligence in Digital HR	0.89	0.92	0.66
Employee Engagement	0.91	0.93	0.68

The results confirm that both constructs met the criteria for internal consistency reliability and convergent validity.

**Structural Model Evaluation (Inner Model)
Coefficient of Determination (R²)**

The coefficient of determination indicates that artificial intelligence in digital HR practices explained a substantial proportion of variance in employee engagement.

Table 2. Coefficient of Determination

Endogenous Variable	R ²
Employee Engagement	0.47

An R² value of 0.47 suggests that 47% of the variance in employee engagement is explained by AI-based digital HR practices, indicating a moderate-to-strong explanatory power.

Hypothesis Testing

The structural relationship between artificial intelligence in digital HR practices and employee engagement was tested using bootstrapping procedures.

Table 3. Structural Path Results

Path	Path Coefficient	t-value	p-value
AI in Digital HR → Employee Engagement	0.69	11.84	< 0.001

The results show a positive and statistically significant effect of artificial intelligence in digital HR practices on employee engagement. The path coefficient ($\beta = 0.69$) indicates a strong relationship, while the p-value (< 0.001) confirms high statistical significance.

Discussion

The measurement model results reported in Table 1 demonstrate that all indicators for the constructs of Artificial Intelligence in Digital HR Practices and Employee Engagement achieved strong reliability and convergent validity, with composite reliability values exceeding 0.90 and AVE values above 0.60. These findings confirm that both variables are not simple observable measures but multidimensional latent constructs that capture employees' lived experiences when interacting with AI-enabled HR systems. The indicators representing automation of HR services, decision accuracy, personalization, transparency, ease of interaction, and perceived usefulness collectively reflect how employees perceive the role of AI in shaping their work environment. This aligns with Malik et al. (2022), who argue that employee experience within AI-based HR ecosystems constitutes a central pathway through which engagement is formed.

The coefficient of determination presented in Table 2 shows an R^2 value of 0.47, indicating that 47 percent of the variance in employee engagement is explained solely by AI in digital HR practices. In behavioral and organizational research, this value represents substantial explanatory power, especially for a model consisting of a single direct path. This result suggests that AI in HR functions as a structural determinant of employees' psychological attachment to their work and organization. Sahu et al. (2025) and Kayusi et al. (2025) similarly emphasize that AI-driven HR analytics influence not only operational efficiency but also employees' affective and behavioral outcomes.

The structural path results in Table 3 reveal a strong and statistically significant relationship between AI in digital HR practices and employee engagement, with a path coefficient of 0.69 and a p-value below 0.001. This coefficient indicates that when employees perceive AI systems as useful, transparent, accurate, and supportive, their cognitive, emotional, and behavioral engagement increases substantially. Rožman et al. (2023) explain that reducing monotonous workload through AI allows employees to concentrate on meaningful tasks, which strengthens cognitive engagement. The findings of this study empirically support this mechanism.

From a theoretical perspective, the mechanism through which AI enhances engagement can be understood through the improvement of employee experience. Malik et al. (2022) highlight that AI-enabled HR ecosystems provide real-time feedback, personalized development pathways, and transparent decision processes, which foster a perception of organizational support. This perception contributes directly to emotional engagement, as described by Gayathiri (2025) and Rani et al. (2025), who identify meaningfulness and psychological safety as critical antecedents of engagement.

AI-based recruitment and selection also contribute to engagement through improved person-job fit. Chao et al. (2025) and Sahu et al. (2025) note that intelligent recruitment systems enhance candidate experience and placement accuracy, leading to long-term engagement and retention. Employees who feel appropriately matched to their roles demonstrate stronger cognitive engagement because their work aligns with their competencies and expectations. In the domain of learning and development, AI facilitates adaptive training and personalized career pathways. Appoh et al. (2025) argue that such personalization enhances employee well-being and organizational commitment. When employees perceive that HR systems understand and respond to their individual development needs, emotional attachment to the organization strengthens.

The integration of sentiment analysis, chatbots, and real-time feedback platforms allows HR departments to monitor employee emotions and respond proactively. Kayusi et al. (2025) report that data-driven interventions of this type significantly increase engagement scores and reduce turnover rates. This mechanism explains the

enhancement of behavioral engagement, as employees feel acknowledged and supported in real time. However, the positive relationship identified in this study must be interpreted carefully. Patel (2025) and Okatta et al. (2024) caution that AI may generate anxiety when perceived as a surveillance tool. Therefore, the strong positive effect observed in this study implies that respondents operate in environments where AI is implemented in a transparent and human-centered manner. Matin (2025) emphasizes that the design and communication of AI systems determine whether technology enhances or undermines engagement.

The findings also underscore the importance of strategic intent in AI adoption. Alzeiby et al. (2025) state that AI integration without clear HR strategy fails to produce meaningful psychological outcomes. The high path coefficient in this study indicates that organizations have embedded AI strategically within HR practices rather than adopting it superficially. Prior studies such as Mishra and Mishra (2025) note that fully automated performance appraisal may create perceptions of unfairness if not combined with human judgment. This explains why transparency and perceived fairness emerge as critical indicators within the AI construct in this study. Employees trust AI when it supports, rather than replaces, human decision-making. These results further support the view of AI in HR as a socio-technical system. Sundari et al. (2024) describe how AI shifts employee focus from routine tasks to strategic activities, strengthening cognitive and behavioral engagement. The present findings are consistent with this perspective.

The relevance of these findings is particularly significant in the context of emerging digital HR adoption in Indonesia and Southeast Asia, where organizations are rapidly integrating AI technologies while employees are still adapting to digital work systems. Studies such as Sundari et al. (2024) and Setiawan et al. (2025) highlight that digital HR transformation in this region is closely associated with workforce resilience and innovation capacity. Therefore, the strong relationship observed in this study may reflect the transitional nature of digital adoption, where AI is perceived as supportive rather than threatening, thereby strengthening engagement.

The findings also underline the importance of ethical and human-centered AI governance in HR practices. As noted by Patel (2025), Okatta et al. (2024), and Matin (2025), AI systems may reduce engagement when perceived as surveillance mechanisms or opaque decision tools. Therefore, transparency, explainability, and human oversight are essential principles in AI-based HR design. Employees are more likely to trust AI systems when they complement rather than replace human judgment, particularly in performance evaluation and feedback processes.

Overall, the findings demonstrate that AI-based digital HR practices significantly enhance employee engagement. The measurement model confirms that the constructs were measured reliably and validly, while the structural model shows that artificial intelligence is a strong predictor of employee engagement. These results provide empirical support for the proposed hypothesis and establish a solid foundation for further discussion regarding the psychological and managerial implications of AI-driven HR systems.

CONCLUSION

This study concludes that artificial intelligence embedded in digital human resource practices has a significant and positive effect on employee engagement. Using SEM-PLS analysis, the findings confirm that AI-driven HR systems contribute meaningfully to employees' cognitive, emotional, and behavioral engagement by enhancing efficiency, personalization, and perceived organizational support. From a theoretical perspective, this research extends employee engagement literature by integrating artificial

intelligence as a core construct within digital HR frameworks. The study demonstrates that AI should be conceptualized not only as a technological innovation but also as a socio-technical mechanism that shapes employees' work experiences and psychological states. This contributes empirical evidence to digital HR and HR analytics research, which has often focused more on performance outcomes than engagement-related effects.

Practically, the findings suggest that organizations should adopt human-centered AI strategies in HR implementation. AI systems should be designed to support transparency, developmental feedback, and employee autonomy in order to maximize engagement outcomes. Managers and HR professionals should prioritize ethical governance, user communication, and continuous evaluation of AI tools to ensure that technological adoption strengthens, rather than undermines, employee engagement.

Despite its contributions, this study has limitations. The cross-sectional design restricts causal inference over time, and the reliance on self-reported data may introduce perceptual bias. Future research is encouraged to employ longitudinal designs, explore mediating variables such as trust or employee experience, and examine cross-industry or cross-cultural contexts to further deepen understanding of AI-driven HR and employee engagement.

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