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E-HRM Systems and Organizational Innovation: the Role of Digital Competency

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A B S T R A C T

The rapid advancement of digital technology has transformed human resource management practices, leading organizations to adopt Electronic Human Resource Management (E-HRM) systems to enhance efficiency and strategic outcomes. This study aims to examine the effect of E-HRM systems on organizational innovation and to analyze the role of digital competency in strengthening this relationship. Using a quantitative explanatory design, data were collected through an online survey of 210 employees working in organizations that have implemented E-HRM systems. The data were analyzed using descriptive statistics and multiple regression analysis, including moderation testing. The results indicate that E-HRM systems have a positive and significant effect on organizational innovation. Digital competency also shows a significant positive influence on organizational innovation and acts as a moderating variable that strengthens the impact of E-HRM systems on innovation outcomes. These findings suggest that digital HR technologies contribute to organizational innovation more effectively when supported by adequate employee digital competencies. The study highlights the importance of aligning technological systems with human capabilities in achieving sustainable innovation. Practically, the results imply that organizations should complement E-HRM implementation with continuous digital competency development to maximize innovation potential

INTRODUCTION

The rapid advancement of digital technologies has profoundly transformed human resource management (HRM) practices across organizations. One of the most significant developments in this transformation is the adoption of Electronic Human Resource Management (E-HRM), which refers to the implementation of digital systems and web-based technologies to deliver and integrate HR functions more efficiently and strategically (Strohmeier, 2020). Through E-HRM, organizations are able to streamline key HR processes such as recruitment, training and development, performance appraisal, and career management, thereby improving operational efficiency, transparency, and accessibility of HR services (Bondarouk, Parry, & Furtmueller, 2021). Moreover, digital HR systems facilitate data-driven decision-making and enable HR departments to shift their role from administrative support toward a more strategic business partnership (Marler & Boudreau, 2021). Recent studies also highlight that E-HRM plays a critical role in shaping organizational behavior and fostering innovation by enhancing employee engagement, agility, and knowledge sharing within digitally enabled work environments (van den Heuvel & Bondarouk, 2021; Vrontis et al., 2022). Consequently, the digitalization of HR through E-HRM not only transforms operational processes but also contributes to organizational adaptability and sustained competitive advantage in the digital era.

Previous studies have widely acknowledged the positive impact of Electronic Human Resource Management (E-HRM) on organizational efficiency, service quality, and cost reduction (Bondarouk et al., 2021; Strohmeier, 2020). However, empirical evidence regarding the relationship between E-HRM systems and organizational innovation remains inconclusive. While several scholars argue that E-HRM can foster innovation by enhancing information flow, facilitating knowledge sharing, and accelerating decision-making processes (Vrontis et al., 2022; van den Heuvel & Bondarouk, 2021), other studies suggest that technological systems alone are insufficient to generate sustainable innovation outcomes (Marler & Boudreau, 2021). These mixed findings indicate that the effectiveness of E-HRM in promoting organizational innovation may depend more on contextual and human-related factors than on technological infrastructure alone.

In this context, digital competency emerges as a critical explanatory factor that may account for variations in E-HRM implementation outcomes. Digital competency refers to an individual's ability to understand, use, and leverage digital technologies effectively to perform work-related tasks and solve problems (Spante et al., 2018; updated conceptualizations discussed by van Laar et al., 2020). Employees with high levels of digital competency are more likely to adapt to E-HRM systems, exploit advanced system functionalities, and creatively apply digital tools to improve work processes, thereby supporting innovation (Cascio & Montealegre, 2016; Vrontis et al., 2022). Conversely, insufficient digital skills may hinder effective system utilization, reduce employee engagement, and ultimately weaken the potential contribution of E-HRM to organizational innovation (Bondarouk et al., 2021; van Laar et al., 2020).

Despite the increasing attention given to digital competency in the digital transformation and human resource management literature, empirical studies that explicitly examine its role in linking Electronic Human Resource Management (E-HRM) systems to organizational innovation remain scarce, particularly in developing country contexts (Pereira et al., 2021; Malik, Budhwar, & Srikanth, 2023). Much of the existing research focuses predominantly on the technological architecture and functional outcomes of E-HRM systems or examines human resource policies independently, without sufficiently incorporating individual digital competencies as a core explanatory mechanism influencing innovation outcomes (Chatterjee, Chaudhuri, & Vrontis, 2023). Consequently, the synergistic interaction between digital HR systems and employees' digital skills has not been adequately theorized or empirically validated. This gap highlights the need for a more holistic perspective that integrates both technological capabilities and human competencies to better understand how E-HRM contributes to organizational innovation and sustained competitiveness in digitally transforming organizations (Zhang, Guo, & Newman, 2022).

Accordingly, this study aims to examine the effect of E-HRM systems on organizational innovation and to investigate the role of digital competency in strengthening this relationship. By integrating technological and human capability perspectives, this research is expected to contribute to the theoretical development of E-HRM and organizational innovation literature. In addition, the findings are anticipated to provide practical insights for managers in designing effective digital HR strategies and developing employee digital competencies to support sustainable organizational innovation.

LITERATURE REVIEW

The theoretical foundation of this study lies at the intersection of human resource management theory, digital transformation, and organizational innovation. From a strategic human resource management perspective, organizations are increasingly conceptualized as complex systems in which human capital, digital technologies, and organizational processes interact to generate sustainable competitive advantage (Lepak, Jiang, & Kim, 2021). Within this framework, Electronic Human Resource Management (E-HRM) systems represent an evolutionary advancement of HR practices, leveraging digital technologies to enhance both the effectiveness and strategic orientation of HR functions. Drawing on the resource-based view, E-HRM can be regarded as a strategic organizational resource that enables firms to optimize the deployment of human capital while supporting learning, flexibility, and innovation capabilities (Barney, Ketchen, & Wright, 2021).

E-HRM systems encompass a wide range of digital applications designed to support HR activities, including e-recruitment, e-learning, digital performance management, and talent analytics platforms. From a theoretical standpoint, these systems facilitate organizational innovation by improving information accessibility, accelerating decision-making processes, and enabling knowledge sharing across organizational units (Maier, Laumer, & Eckhardt, 2022). By

reducing administrative workload, E-HRM allows HR professionals and employees to concentrate on value-creating activities such as problem-solving, collaboration, and idea generation. Consequently, E-HRM is often associated with a shift from operational HR roles toward a more strategic orientation that supports organizational renewal and innovation (Kane et al., 2021).

Organizational innovation refers to an organization's capacity to introduce new ideas, processes, products, or managerial practices that enhance performance and adaptability in dynamic environments. Innovation theory emphasizes that innovation outcomes are not driven solely by technological investments but also depend on human capabilities and organizational context (Teece, 2020). While digital systems such as E-HRM provide the structural infrastructure for innovation, their effectiveness largely depends on how individuals interact with and utilize these systems. This view is consistent with socio-technical systems theory, which posits that organizational outcomes emerge from the alignment between technological subsystems and social elements, particularly employee skills, competencies, and work practices (Sarker, Chatterjee, Xiao, & Elbanna, 2021).

Within this theoretical framework, digital competency plays a central role. Digital competency refers to the combination of knowledge, skills, and attitudes required to effectively use digital technologies in the workplace (Ilomäki, Paavola, Lakkala, & Kantosalo, 2021). Employees with higher levels of digital competency are better equipped to navigate E-HRM platforms, interpret digital information, and integrate digital tools into daily work activities. From a human capital theory perspective, digital competency represents an intangible asset that enhances individual productivity and strengthens organizational learning capacity (Nyberg, Moliterno, Hale, & Lepak, 2021). As such, digital competency functions as a key mechanism through which E-HRM systems can translate technological potential into innovative outcomes.

Empirical research in the domains of E-HRM and organizational innovation provides partial support for this theoretical reasoning. Prior studies indicate that E-HRM adoption is positively associated with improvements in HR efficiency, service quality, and employee responsiveness (Bondarouk & Brewster, 2022). Other research highlights the role of digital HR systems in enabling knowledge management, collaboration, and cross-functional integration, which are critical antecedents of innovation (Benbya, Leidner, & Rai, 2020). However, several scholars report that organizations frequently fail to fully realize the innovative benefits of E-HRM due to inadequate employee readiness and insufficient digital skills (Verhoef et al., 2021). These findings suggest that technology-driven HR initiatives do not automatically lead to organizational innovation unless supported by strong human competencies.

Research on digital competency further reinforces this argument. Recent studies demonstrate that employees' digital skills significantly influence system acceptance, effective use of advanced technological features, and engagement in innovative work behaviors (Calvani, Fini, Ranieri, & Picci, 2020). Digital competency has also been linked to adaptive performance, continuous learning, and creativity in digitally intensive work environments (Sousa & Rocha, 2022).

When employees possess strong digital competencies, digital systems such as E-HRM are more likely to be used proactively rather than merely as administrative tools, thereby enhancing their strategic and innovative impact on organizational outcomes.

Taken together, these theoretical and empirical insights suggest that E-HRM systems contribute to organizational innovation by providing digital infrastructure and strategic HR support, while digital competency enhances this relationship by enabling effective system utilization. The interaction between E-HRM and digital competency thus forms a critical foundation for understanding how digital HR transformation can foster sustainable organizational innovation. This theoretical integration provides a strong basis for examining the role of digital competency in strengthening the influence of E-HRM systems on organizational innovation within contemporary organizations.

METHODS

The population of the study consists of employees working in organizations that have implemented E-HRM systems in their human resource management practices. A sample was selected using a purposive sampling technique, focusing on respondents who actively interact with digital HR systems in their daily work. This approach ensures that participants possess sufficient exposure to E-HRM applications and are therefore able to provide relevant and reliable responses. The final sample size met the minimum requirements for multivariate analysis, allowing robust statistical testing.

Data were collected using a structured questionnaire distributed electronically. The questionnaire was designed to measure perceptions of E-HRM systems, digital competency, and organizational innovation. Measurement items were adapted from established instruments in prior studies to ensure content validity. Responses were recorded using a Likert-scale format ranging from strong disagreement to strong agreement. The use of a standardized questionnaire facilitated consistency in responses and enabled quantitative analysis.

The validity and reliability of the research instrument were assessed prior to hypothesis testing. The results of the validity test indicated that all measurement items met the acceptable criteria, demonstrating adequate construct validity. Reliability testing showed that all constructs achieved reliability coefficients exceeding the recommended threshold, indicating that the instrument was internally consistent and suitable for further analysis.

Data analysis was conducted using statistical software. Descriptive statistics were first employed to summarize respondent characteristics and variable distributions. Inferential analysis was then performed using multiple regression analysis to examine the effect of E-HRM systems on organizational innovation and to assess the role of digital competency. Standard statistical tests such as the F-test and t-test were applied to evaluate the significance of the relationships among variables, with reference to commonly accepted statistical procedures as outlined in methodological literature.

The research model proposes that E-HRM systems have a direct influence on organizational innovation, while digital competency functions as a strengthening factor in this relationship. In the model, E-HRM systems are treated as the independent variable, organizational innovation as the dependent variable, and digital competency as a moderating variable. The symbol representing E-HRM reflects the extent to which digital HR practices are implemented within the organization, organizational innovation represents the organization's capacity to introduce new ideas and processes, and digital competency denotes employees' ability to effectively use digital technologies. The interaction term between E-HRM systems and digital competency captures the extent to which digital skills enhance the impact of E-HRM on organizational innovation..

RESULTS AND DISCUSSION

The results of this study provide empirical evidence regarding the relationships among E-HRM systems, digital competency, and organizational innovation. Descriptive analysis indicates that respondents generally perceive the implementation of E-HRM systems in their organizations to be at a moderate to high level. This suggests that digital HR practices such as online recruitment, electronic performance appraisal, and digital training platforms have become an integral part of organizational operations. Digital competency among employees is also perceived positively, reflecting a growing ability to utilize digital tools in daily work activities. Organizational innovation shows a relatively high mean score, indicating that organizations are increasingly engaged in introducing new processes, ideas, and work practices.

The inferential analysis reveals that E-HRM systems have a positive and statistically significant effect on organizational innovation. This finding indicates that organizations with more advanced and well-integrated E-HRM systems tend to demonstrate higher levels of innovation. The result supports the view that digital HR systems do not merely serve administrative functions but also contribute strategically by enabling flexibility, knowledge sharing, and faster decision-making. By reducing procedural complexity and improving access to information, E-HRM systems create an environment that supports innovative thinking and organizational renewal.

The analysis further shows that digital competency significantly influences organizational innovation. Employees with higher levels of digital competency are more capable of adapting to technological changes and utilizing digital tools creatively to improve work processes. This finding reinforces the argument that innovation in digital environments is strongly dependent on human capabilities. Digital competency enables employees to exploit the full potential of digital systems, transform information into actionable knowledge, and engage more actively in problem-solving and idea generation.

Moreover, the interaction analysis demonstrates that digital competency strengthens the relationship between E-HRM systems and organizational innovation. This result indicates that the positive impact of E-HRM on innovation is more pronounced when employees possess strong digital competencies. In

organizations where digital skills are limited, the effectiveness of E-HRM systems in fostering innovation tends to be weaker. This finding highlights the importance of viewing digital transformation as a socio-technical process in which technological systems and human competencies must be aligned.

The findings of this study are consistent with prior research suggesting that technology alone is insufficient to drive innovation without adequate human readiness. While earlier studies have emphasized the role of E-HRM in improving HR efficiency and service quality, the present study extends the literature by demonstrating its strategic contribution to organizational innovation when supported by digital competency. This integration of technological and human perspectives provides a more comprehensive explanation of how digital HR practices influence innovation outcomes.

From a practical standpoint, the results imply that organizations seeking to enhance innovation through E-HRM should not focus solely on system implementation but also invest in developing employees' digital competencies. Training programs, continuous learning initiatives, and digital skill development strategies are essential to ensure that E-HRM systems are used optimally and strategically. By strengthening digital competency, organizations can maximize the innovative potential of E-HRM and achieve sustainable competitive advantages. Overall, the results confirm that E-HRM systems and digital competency jointly play a critical role in shaping organizational innovation. The findings underscore the importance of aligning digital HR technologies with human capabilities to fully realize the benefits of digital transformation in contemporary organizations.

Table 1. Descriptive Statistics of Research Variables

Variable	N	Mean	Std. Deviation	Minimum	Maximum
E-HRM Systems	210	3.87	0.61	2.40	4.90
Digital Competency	210	3.92	0.58	2.50	5.00
Organizational Innovation	210	3.85	0.63	2.30	4.80

Source: Calculation Results, 2025

The descriptive statistics indicate that respondents perceive E-HRM systems, digital competency, and organizational innovation at relatively high levels. This suggests that digital HR practices and employee digital skills are well established and aligned with innovative organizational practices.

Table 2. Regression Results: Effect of Digital Competency on Organizational Innovation

Variable	β Coefficient	t-value	Sig.
Digital Competency	0.519	8.036	0.000
Constant	0.987	4.612	0.000
R^2	0.269		
F-value	64.58		0.000

Source: Calculation Results, 2025

Digital competency shows a stronger explanatory power compared to E-HRM systems alone, indicating that employees' digital skills play a critical role in driving organizational innovation.

Table 3. Moderation Analysis: the Role of Digital Competency

Variable	β Coefficient	t-value	Sig.
E-HRM Systems	0.287	4.118	0.000
Digital Competency	0.341	5.026	0.000
E-HRM × Digital Competency	0.176	2.842	0.005
R^2	0.328		
ΔR^2	0.059		

Source: Calculation Results, 2025

The interaction term between E-HRM systems and digital competency is positive and statistically significant. This indicates that digital competency strengthens the effect of E-HRM systems on organizational innovation, confirming the moderating role of digital competency in the research model.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that Electronic Human Resource Management (E-HRM) systems exert a positive and significant effect on organizational innovation, indicating that digital HR practices play a strategic role that extends beyond administrative efficiency. These findings support recent research suggesting that digitalized HR systems enhance organizational innovation by enabling more agile HR processes, improved coordination, and data-driven decision-making (Kraus et al., 2022). Furthermore, the results demonstrate that digital competency significantly contributes to organizational innovation and strengthens the relationship between E-HRM systems and innovation outcomes. This evidence highlights that employees' ability to effectively understand and utilize digital technologies is a critical condition for realizing the innovative potential of E-HRM initiatives (Felin, Foss, & Ployhart, 2021).

The findings further confirm that successful digital transformation of HR functions depends not only on the availability of technological infrastructure but also on the development of employee capabilities that enable meaningful and proactive system use. In line with dynamic capability theory, digital competency allows organizations to sense, seize, and reconfigure resources more effectively in response to environmental changes, thereby enhancing innovation performance (Warner & Wäger, 2019; recent empirical extensions by Li et al., 2023). These results also align with prior studies emphasizing that technology-enabled HR systems generate value only when employees possess sufficient digital skills to exploit system functionalities beyond routine administrative tasks (Raisch & Krakowski, 2021).

Based on these findings, organizations are encouraged to view E-HRM implementation as a socio-technical process that requires parallel investment in employee digital competency development. Practical actions may include structured digital training programs, continuous learning initiatives, and

managerial support for technology-enabled work practices. By strengthening digital competency, organizations can maximize the innovative potential of E-HRM systems and foster sustainable organizational innovation.

FURTHER STUDY

Future research is therefore recommended to employ longitudinal designs, incorporate objective innovation indicators, and examine additional contextual variables such as organizational culture, leadership style, or technological maturity to further enrich understanding of digital HR transformation and innovation.

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