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MEDIATING ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON THE RELATIONSHIP BETWEEN ELECTRONIC HUMAN RESOURCE MANAGEMENT (E-HRM) PRACTICES AND ORGANIZATIONAL AGILITY IN FEDERAL POLYTECHNIC MONGUNO AND RAMAT POLYTECHNIC MAIDUGURI, BORNO STATE

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Abstract

This study examines the mediating effect of Information and Communication Technology (ICT) adoption on the relationship between Electronic Human Resource Management (E-HRM) practices and organizational agility in the digital age. The study focuses on Federal Polytechnic Monguno and Ramat Polytechnic Maiduguri, Borno State, Nigeria, where the need for adaptive and responsive organizational systems is increasingly critical. A cross-sectional survey research design was adopted, using a census sampling technique to collect data from 189 top management staff, Heads of Departments, unit heads and directors of Ramat Polytechnic Maiduguri and Federal Polytechnic Monguno. Data were collected through a structured questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that E-HRM practices; e-recruitment, e-training and e-performance appraisal have a significant positive effect on ICT adoption, but do not directly influence organizational agility. However, ICT adoption was found to have a strong and significant effect on organizational agility. Furthermore, the results indicate that ICT adoption fully mediates the relationship between E-HRM practices and organizational agility, suggesting that the impact of E-HRM on agility is realized primarily through effective ICT integration. The study concludes that ICT adoption is a critical mechanism for translating digital HR practices into organizational agility. This study contributes to the literature by providing empirical evidence on the mediating role of ICT in the E-HRM–organizational agility relationship within the context of developing economies.

Keywords: E-HRM, ICT and Organisational Agility

Introduction

The growth of Information and Communication Technology (ICT) has transformed the way organizations operate in the digital age. Many organizations now use digital systems such as online recruitment platforms, virtual training, electronic performance appraisal and communication technologies to improve efficiency and service delivery (Tallon et al., 2019). In higher institutions, ICT supports faster communication, effective record management, online learning, and quick decision-making. Organizations that effectively adopt ICT are often more flexible and responsive to environmental changes (Kwasek et al., 2024).

Similarly, Electronic Human Resource Management (E-HRM) has become an important strategy for managing employees through digital technologies. E-HRM involves the use of electronic systems in carrying out HR activities such as e-recruitment, e-training, and e-performance appraisal (Nematollahi et al., 2024). These

practices help organizations reduce paperwork, improve communication, enhance employee development, and increase operational efficiency (Strohmeier, 2007). Through E-HRM practices, organizations can build a more adaptive and responsive workforce capable of meeting challenging organisational demands (Heffernan et al., 2022).

In this digital ag, organisational agility has become essential for survival and growth of any organisation. Organizational agility refers to the ability of an organization to quickly respond to changes, solve problems and adapt to new opportunities and challenges (Akkaya & Mert, 2022). ICT plays a significant role in enhancing organizational agility because it supports fast information sharing, coordination and effective decision-making (Bondarouk & Brewster, 2016).

Despite the growing importance of ICT and E-HRM, many public higher institutions in Nigeria still face challenges in adopting digital HR systems. Institutions such as Federal Polytechnic Monguno and Ramat Polytechnic Maiduguri continue to experience limited ICT infrastructure, slow digital transformation and reliance on traditional HR practices. These challenges reduce their ability to respond effectively to technological and administrative changes.

Previous studies have examined the relationship between E-HRM practices and organizational agility (Khammadee, 2023; Asfahani, 2021; Saha et al., 2019). Other studies also showed that ICT improves organizational efficiency and supports digital transformation (Almasradi et al., 2022; Gadzali et al., 2023). However, limited studies have examined the mediating role of ICT adoption in the relationship between E-HRM practices and organizational agility, especially in public higher institutions in Nigeria. Therefore, this study examines the mediating role of ICT adoption on the relationship between E-HRM practices and organizational agility in Federal Polytechnic Monguno and Ramat Polytechnic Maiduguri, Borno State.

Objectives of the Study

The main objective of this study is to examine the mediating effect of ICT Adoption on the relationship between E-HRM practice and organizational agility in the digital age in Ramat Polytechnic and Federal Polytechnic Monguno. While the specific objectives are:

1. To examine the relationship between Electronic Human Resource Management (E-HRM) practices and organizational agility in the Digital Age at Ramat Polytechnic and Federal Polytechnic Monguno
2. To assess the impact of Information and Communication Technology (ICT) adoption on E-HRM practices in Ramat Polytechnic and Federal Polytechnic Monguno Borno State
3. To evaluate the mediating role of ICT in the relationship between HRM practices and organizational agility in Ramat Polytechnic and Federal Polytechnic Monguno.

Research Hypothesis

H_O1 There is no significant effect of E-recruitment on organizational agility in the Digital Age in Ramat Polytechnic and Federal Polytechnic Monguno.

H_O2 There is no significant effect of E-training on organizational agility in the Digital Age at Ramat Polytechnic and Federal Polytechnic Monguno.

Ho3 There is no significant effect of E-performance Appraisal on organizational agility in the Digital Age at Ramat Polytechnic Federal Polytechnic Monguno.

H_O4 ICT adoption mediates the relationship between e-recruitment and organizational agility at Ramat Polytechnic and Federal Polytechnic Monguno

H_O5 ICT adoption mediates the relationship between e-training and organizational agility in Ramat Polytechnic and Federal Polytechnic Monguno

H_O6 ICT adoption mediates the relationship between e-performance appraisal and organizational agility in Ramat Polytechnic Federal Polytechnic Monguno.

Literature Review

Organisational Agility

Organizational agility refers to an organization's ability to respond quickly and effectively to changes in customer demands, technological developments and competitive pressures. It emphasizes flexibility, speed and adaptability in organizational processes, making it important in today's dynamic business environment (Akkaya & Mert, 2022). According to Khammadee (2023), organizational agility also involves creating a culture that promotes innovation, continuous learning and proactive change management. This enables organizations to adapt to environmental changes and remain competitive. In addition, agile organizations

encourage continuous improvement by viewing mistakes as learning opportunities and using feedback to improve performance and operations. Organizations that support learning and adaptability are more likely to achieve long-term effectiveness and competitiveness (O'Reilly & Tushman, 2013).

Electronic Human Resource Management (EHRM)

Electronic Human Resource Management (E-HRM) refers to the use of digital technologies to manage human resource activities such as recruitment, training, performance management and employee engagement. E-HRM helps organizations improve efficiency, accessibility and decision-making by moving HR activities to digital platforms (Nematollahi et al., 2023). It also supports better alignment between HR functions and organizational goals, thereby improving organizational responsiveness and flexibility in the digital age (Strohmeier, 2007). In addition, E-HRM enhances communication, transparency, and accessibility for both HR managers and employees, contributing to a more adaptive organizational environment.

E-Recruitment

E-recruitment refers to the use of digital platforms such as job portals, organizational websites and social media to attract and recruit employees. It helps organizations reach a wider pool of applicants and identify qualified candidates more efficiently (Poisat & Mey, 2017). E-recruitment also involves the use of online systems for job advertisement, applicant screening and candidate selection. By automating recruitment processes, organizations can improve the speed and effectiveness of hiring activities and manage large numbers of applications more easily (Almasradi et al., 2024).

E-Training

E-training involves using digital tools and platforms to deliver training programs, enabling employees to learn new skills and improve competencies through online resources. This method supports flexibility, allowing learners to access training materials at any time, which enhances engagement and retention (Noe et al., 2021). E-training is the implementation of web-based training modules tailored to meet the specific learning needs of employees, offering scalable and personalized content. This approach reduces the cost and logistical challenges of traditional training while ensuring consistent skill development across the workforce (Stone et al., 2020).

E-Performance Appraisal

E-performance appraisal refers to the use of digital systems to assess, monitor and manage employee performance. It allows organizations to provide continuous feedback, reduce paperwork and track employee performance in real time, thereby supporting effective decision-making (Dessler, 2020). E-performance appraisal also helps organizations conduct more structured, transparent and consistent evaluations. Through automated appraisal systems, managers can provide timely feedback, support employee development and ensure that employee performance aligns with organizational goals (Aguinis, 2019).

Information Communication Technology (ICT)

Information and Communication Technology (ICT) refers to digital tools and systems used for creating, storing, processing and sharing information. It includes technologies such as computers, networks, communication systems and digital platforms that support efficient communication and data management (O'Brien & Marakas, 2021). ICT plays an important role in digital transformation by helping organizations improve operations, decision-making, and service delivery through the use of digital technologies (Kwasek et al., 2024). ICT also supports communication, collaboration, and knowledge sharing through tools such as video conferencing, intranets, and document-sharing platforms, thereby promoting a more efficient work environment (Nath & Agrawal, 2020).

ICT Adoption as Mediator

In the digital age, Information and Communication Technology (ICT) has improved organizational operations by enhancing the effectiveness of Human Resource Management (HRM) practices and supporting organizational agility (Alrawashdeh et al., 2021). ICT helps organizations streamline HR processes, improve communication, and support quick decision-making, thereby making organizations more flexible and responsive to change (Kwasek et al., 2024).

ICT also plays a mediating role in the relationship between HRM practices and organizational agility by improving communication, coordination and access to employee information. ICT-based HR systems provide real-time data on employee performance, skills and development needs, helping organizations respond quickly to changing workforce demands (Gadzali et al., 2023). In addition, ICT supports training and development through digital learning platforms that help employees acquire new skills needed to adapt to technological changes (Boudlaie et al., 2022).

Furthermore, digital communication tools such as video conferencing, instant messaging, and project management platforms improve collaboration and

information sharing across departments, which strengthens organizational responsiveness and teamwork (Almasradi et al., 2022). ICT also promotes continuous learning and innovation by giving employees easier access to knowledge and training resources (Nematollahi et al., 2024). Therefore, ICT serves as an important mechanism through which HRM practices enhance organizational agility

Theoretical Framework

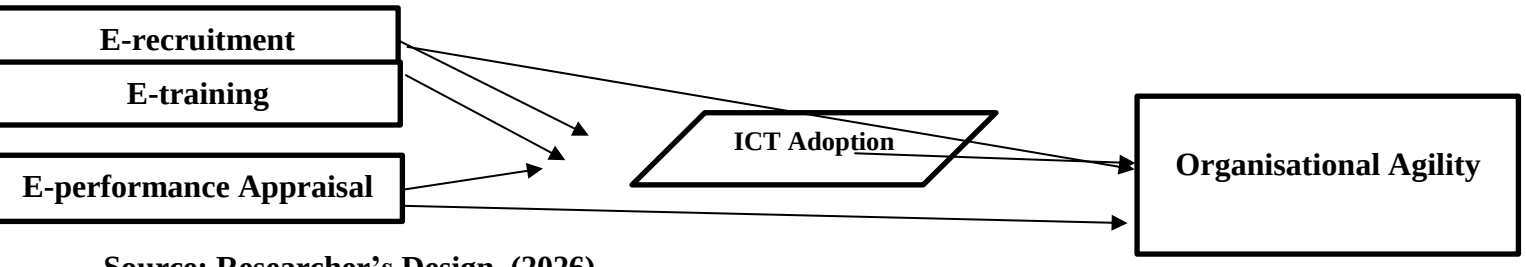
Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Venkatesh et al. (2003) to explain how individuals adopt and use technology in organizations. The theory identifies four main factors influencing technology adoption: performance expectancy, effort expectancy, social influence and facilitating conditions. Performance expectancy refers to the belief that technology will improve job performance, while effort expectancy relates to the ease of using the technology. Social influence refers to the effect of other people's opinions on technology use, and facilitating conditions involve the availability of organizational and technical support for using technology.

UTAUT has been widely used in studies related to technology adoption in organizations because of its strong explanatory ability (Theres et al., 2023). In this study, the theory explains how ICT adoption supports the relationship between E-HRM practices and organizational agility. HR staff are more likely to adopt ICT when they believe it will improve efficiency, simplify HR activities, and support organizational responsiveness (Venkatesh et al., 2003). Therefore, the theory helps explain how ICT adoption strengthens E-HRM practices and improves organizational agility in the digital age (Ruel & Bondarouk, 2014).

Therefore, ICT adoption is expected to mediate the relationship by providing insight into the pathway for the relationship between EHRM practice and organisational agility. Drawing on this proposition, it is postulated that:

Fig. 1 Conceptual Framework



Source: Researcher's Design, (2026)

Methodology

This study adopts a quantitative research design with a cross-sectional survey approach to examine the mediating effect of ICT adoption on the relationship between E-HRM practices and organizational agility. The unit of analysis is the organization, focusing specifically on top management staff, Heads of Departments (HODs), unit heads, and directors of Ramat Polytechnic Maiduguri and Federal Polytechnic Monguno. The total population of the study comprises 196 respondents drawn from these institutions. Given the manageable size of the population, a census sampling technique is employed to ensure that all relevant respondents are included, thereby enhancing the generalizability and accuracy of the findings.

Data for the study are collected using a structured questionnaire, designed to capture responses on E-HRM practices, ICT adoption, and organizational agility. The questionnaire consists of closed-ended items measured on a Likert scale, allowing for standardized responses and ease of quantitative analysis. The instrument is administered directly to the targeted respondents to ensure a high response rate and reliability of data.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), which is suitable for testing complex relationships involving mediation effects. PLS-SEM enables the simultaneous assessment of both the measurement model and the structural model, ensuring robust analysis of the relationships among variables. It is particularly appropriate for this study due to its ability to handle relatively small sample sizes and its effectiveness in predicting key target constructs. The mediation effect of ICT adoption is examined using bootstrapping

procedures to determine the significance of indirect effects.

Result

Data Screening

Prior to the main analysis, preliminary data screening was conducted to ensure the suitability of the dataset for further statistical analysis. The dataset was examined for missing values, outliers, normality, multicollinearity, and linearity assumptions. The results indicated that only a few missing values were present across the dataset. These missing values were minimal and were handled using mean substitution, which is appropriate given the low proportion of missing data and the need to preserve sample size.

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	ER_COM	.388	2.580
	ET_COM	.409	2.444
	EPA_COM	.524	1.909
	ICT_COM	.380	2.629

a. Dependent Variable: OA_COM

The assessment of multicollinearity was conducted using Tolerance and Variance Inflation Factor (VIF) values to determine whether the independent variables exhibit high intercorrelations that could distort the regression estimates.

The results indicate that all predictor variables—E-recruitment (ER_COM), E-training (ET_COM), E-performance appraisal (EPA_COM), and ICT adoption (ICT_COM) have Tolerance values above the minimum acceptable threshold of 0.10 and VIF values well below the critical threshold of 5. Specifically, the VIF values range from 1.909 to 2.629, with ICT_COM showing the highest value (2.629) and EPA_COM the lowest (1.909). These findings suggest that there is no multicollinearity issue among the independent variables, as all values fall within acceptable limits. Therefore, each variable contributes uniquely to explaining variations in organizational agility (OA_COM), and the regression estimates can be considered reliable and stable.

Measurement Model

Output results of the model are displayed for AVE index. As is observed, results indicate the suitability of convergent validity criterion (AVE More than 0.5). Also, the results show that the average variance for each structure is more than the shared variance between that structure and other structures, so this criterion is at a suitable level.

After measuring the reliability and validity of measurement model, structural model was evaluated through the relationships between latent variables. Meanwhile, in present study, most widely used criteria were used for structural model fitness. They are including significant coefficient (t- values), determination coefficient (R2) and Communalities rate. For testing the hypothesis of the present study and evaluating the model's quality (that is, measurement model MM and structural model SM), we have used the smart PLS-SEM

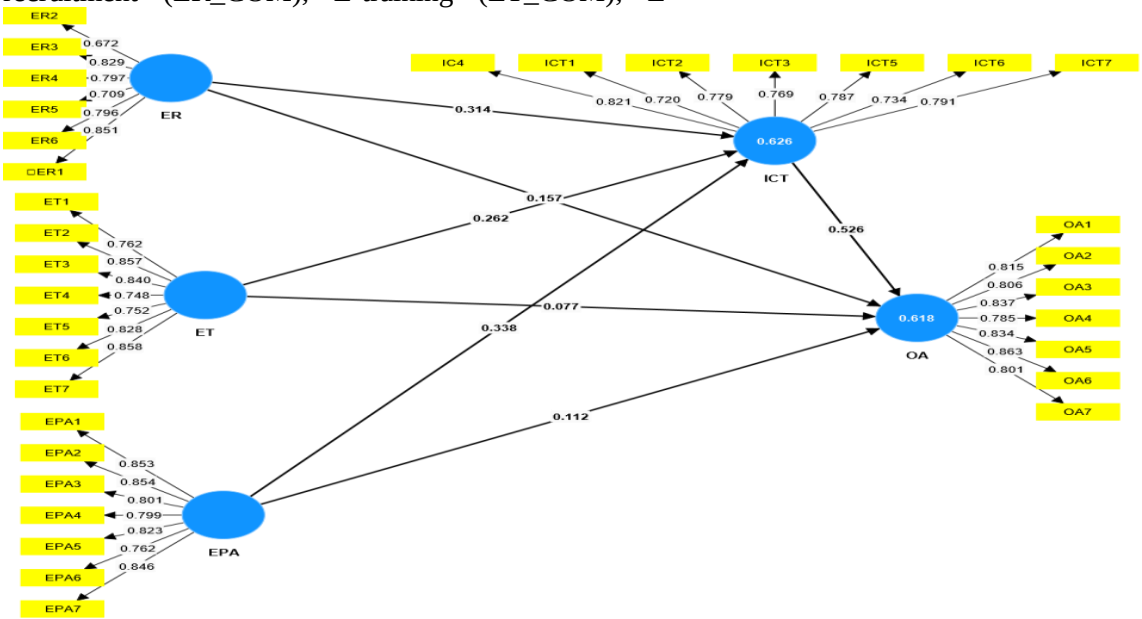


Fig 1 Measurement Model

Table 1 Reliability Statistics

Item	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
EPA	0.919	0.920	0.935	0.673
ER	0.868	0.877	0.901	0.605
ET	0.911	0.913	0.929	0.653
ICT	0.887	0.887	0.912	0.596
OA	0.919	0.920	0.935	0.673

Source: Field Survey, (2026)

The reliability and convergent validity of the constructs were assessed using Cronbach's alpha, composite reliability (rho_a and rho_c), and average variance extracted (AVE). These measures are essential in determining the internal consistency and the extent to which the indicators represent their respective constructs.

The results indicate that all constructs E-performance appraisal (EPA), E-recruitment (ER), E-training (ET), ICT adoption (ICT) and organizational agility (OA) demonstrate high internal consistency reliability. Specifically, Cronbach's alpha values range from 0.868 to 0.919, all exceeding the recommended threshold of 0.70. Similarly, composite reliability values (rho_c) range from 0.901 to 0.935, further confirming strong reliability across all constructs.

In addition, the average variance extracted (AVE) values range from 0.596 to 0.673, all above the minimum acceptable threshold of 0.50. This indicates that each construct explains more than 50% of the variance in its indicators, thereby establishing adequate convergent validity.

Table 2 Discriminant Validity using Heterotrait-monotrait ratio (HTMT) - Matrix

	EPA	ER	ET	ICT
EPA				
ER	0.646			
ET	0.621	0.817		
ICT	0.738	0.793	0.760	
OA	0.650	0.723	0.671	0.843

Source: Field Survey, (2026)

Discriminant validity was assessed to determine the extent to which each construct is distinct from the others in the model. This was evaluated using the Heterotrait-Monotrait ratio (HTMT) criterion.

The results indicate that all HTMT values among the constructs are below the recommended threshold of 0.90. Specifically, the highest HTMT value observed is 0.843 (between ICT and OA), which remains within the acceptable limit. Other values, such as 0.793, 0.760, and 0.738, are also well below the threshold. These findings confirm that each construct is empirically distinct from the others, indicating that the measurement model demonstrates adequate discriminant validity. In other words, the constructs capture unique concepts and do not excessively overlap.

Table 3 Fornell-Larcker criterion

	EPA	ER	ET	ICT	OA
EPA	0.820				
ER	0.579	0.778			
ET	0.568	0.731	0.808		
ICT	0.669	0.701	0.684	0.772	
OA	0.599	0.647	0.616	0.764	0.820

Source: Field Survey, (2026)

The Fornell–Larcker criterion was employed to further assess discriminant validity by comparing the square root of the Average Variance Extracted (AVE) for each construct with the inter-construct correlations. According to this criterion, the square root of AVE (diagonal values) should be greater than the corresponding inter-construct correlations (off-diagonal values). The results show that all constructs meet this requirement. Specifically, the square root of AVE for E-performance appraisal (EPA = 0.820), E-recruitment (ER = 0.778), E-training (ET = 0.808), ICT adoption (ICT = 0.772), and organizational agility (OA = 0.820) are all higher than their respective correlations with other constructs.

Test of Hypothesis

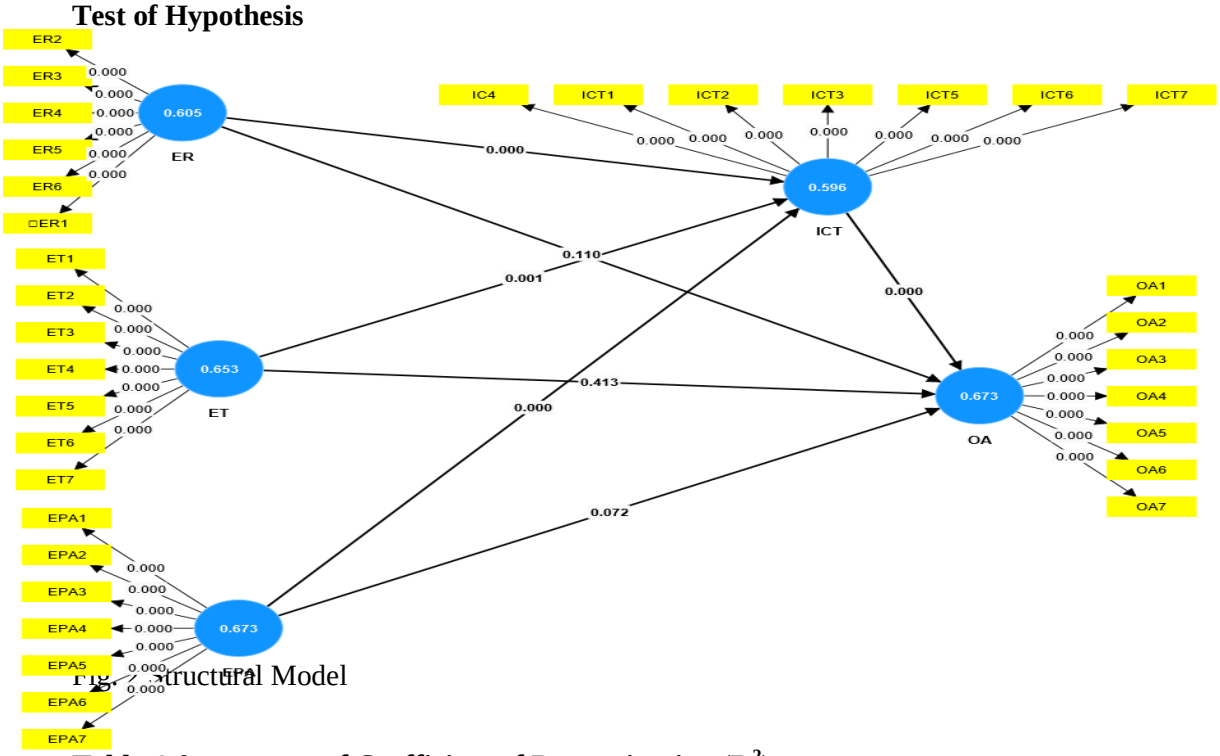


Fig. 2 Structural Model

Table 4 Assessment of Coefficient of Determination (R^2)

[redacted]

Source: (Field Survey, 2026)

The coefficient of determination (R^2) was assessed to evaluate the explanatory power of the structural model, indicating the extent to which the independent variables explain the variance in the endogenous constructs. The results show that ICT adoption has an R^2 value of 0.626 and an adjusted R^2 of 0.620, indicating that approximately 62.6% of the variance in ICT adoption is explained by E-HRM practices (E-recruitment, E-

training, and E-performance appraisal). This suggests a substantial level of explanatory power, as the model accounts for a significant proportion of the variation in ICT adoption.

Similarly, organizational agility has an R^2 value of 0.618 and an adjusted R^2 of 0.610, implying that 61.8% of the variance in organizational agility is explained by the combined effect of E-HRM practices and ICT adoption. This also reflects a moderate to substantial explanatory power of the model. Therefore, the R^2 values indicate that the model has strong predictive accuracy, as a considerable proportion of the variance in both ICT adoption and organizational agility is explained by the predictor variables. These findings demonstrate that E-HRM practices and ICT adoption play a significant role in enhancing organizational agility within the studied institutions.

Hypothesis Testing

Table 5 Result of Direct Effect

	Beta	Std. Dev.	T Stat.	P values
EPA -> ICT	0.338	0.077	4.391	0.000
EPA -> OA	0.112	0.062	1.802	0.072
ER -> ICT	0.314	0.081	3.887	0.000
ER -> OA	0.157	0.098	1.599	0.110
ET -> ICT	0.262	0.082	3.195	0.001
ET -> OA	0.077	0.094	0.819	0.413
ICT -> OA	0.526	0.087	6.041	0.000

Source: Field Survey, (2026)

The structural model was evaluated using path coefficients (β), t-statistics, and p-values obtained through bootstrapping in PLS-SEM. The results reveal the nature and significance of the relationships among E-HRM practices, ICT adoption, and organizational agility.

The findings indicate that E-performance appraisal (EPA) has a significant positive effect on ICT adoption ($\beta = 0.338$, $t = 4.391$, $p < 0.001$). However, its direct effect on organizational agility is not statistically significant ($\beta = 0.112$, $t = 1.802$, $p = 0.072$). Similarly, E-recruitment (ER) shows a significant positive relationship with ICT adoption ($\beta = 0.314$, $t = 3.887$, $p < 0.001$), but its direct effect on organizational agility is not significant ($\beta = 0.157$, $t = 1.599$, $p = 0.110$). In the same vein, E-training (ET) significantly influences ICT adoption ($\beta = 0.262$, $t = 3.195$, $p = 0.001$), yet its direct effect on organizational agility remains insignificant ($\beta = 0.077$, $t = 0.819$, $p = 0.413$).

In contrast, ICT adoption exhibits a strong and significant positive effect on organizational agility ($\beta = 0.526$, $t = 6.041$, $p < 0.001$), indicating that ICT plays a critical role in enhancing organizational responsiveness, flexibility, and adaptability.

Table 6 Assessment of the Indirect Effects

	Beta	Std. Dev.	T Stat.	P values
EPA -> ICT -> OA	0.178	0.054	3.277	0.001
ER -> ICT -> OA	0.165	0.050	3.275	0.001
ET -> ICT -> OA	0.138	0.047	2.922	0.003

Source: Field Survey, (2026)

The mediating role of ICT adoption in the relationship between E-HRM practices and organizational agility was examined using bootstrapping procedures in PLS-SEM. The indirect effects were assessed based on path

coefficients (β), t-statistics, and p-values. The results reveal that ICT adoption significantly mediates the relationship between E-performance appraisal (EPA) and organizational agility (OA) ($\beta = 0.178$, $t = 3.277$, $p = 0.001$). Similarly, the indirect effect of E-recruitment (ER) on organizational agility through ICT adoption is positive and statistically significant ($\beta = 0.165$, $t = 3.275$, $p = 0.001$). In addition, E-training (ET) also demonstrates a significant indirect effect on organizational agility via ICT adoption ($\beta = 0.138$, $t = 2.922$, $p = 0.003$).

Discussion of Findings

The findings in Table 5 show that E-HRM practices have a significant positive effect on ICT adoption but do not have a direct significant effect on organizational agility. The significant relationships between e-performance appraisal, e-recruitment, e-training, and ICT adoption indicate that digital HR practices improve the use of technological systems in organizations (Almasradi et al., 2022). However, the non-significant direct effect on organizational agility suggests that E-HRM practices alone may not be enough to improve agility without adequate technological support (Strohmeier, 2007).

The results also show that ICT adoption has a strong positive effect on organizational agility ($\beta = 0.526$, $p < 0.001$). This means that organizations that effectively adopt ICT are more likely to improve flexibility, responsiveness, and adaptability. This finding agrees with previous studies which found that ICT improves communication, coordination, and decision-making within organizations (Gadzali et al., 2023; Boudlaie et al., 2022). It also supports the view that digital technologies are important drivers of organizational transformation in the digital age (Kwasek et al., 2024).

Furthermore, the mediation results in Table 6 reveal that ICT adoption significantly mediates the relationship between E-HRM practices and organizational agility. The significant indirect effects show that E-HRM practices improve organizational agility mainly through ICT adoption. This finding supports the Unified Theory of Acceptance and Use of Technology (UTAUT), which explains that effective technology use improves organizational performance (Theres et al., 2023). The result also agrees with Gadzali et al. (2023), who found that ICT serves as a link between HR practices and organizational agility. Overall, the findings confirm that ICT adoption is an important mechanism through which E-HRM practices enhance organizational agility.

Conclusion

This study examined the mediating effect of ICT adoption on the relationship between E-HRM practices and organizational agility in state-owned higher institutions. The findings show that e-recruitment, e-training, and e-performance appraisal significantly improve ICT adoption, but do not directly influence organizational agility. However, ICT adoption was found to have a strong positive effect on organizational agility, showing its importance in improving flexibility, responsiveness, and adaptability within organizations.

The study also found that ICT adoption fully mediates the relationship between E-HRM practices and organizational agility. This means that the effectiveness of E-HRM practices in improving organizational agility largely depends on the level of ICT integration within the organization. The findings highlight the importance of combining digital HR practices with effective ICT infrastructure to achieve better organizational outcomes. The study further contributes to literature by showing that ICT adoption is an important link between E-HRM practices and organizational agility in public higher institutions.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. State-owned higher institutions should invest in modern ICT infrastructure and ensure its effective integration with E-HRM systems. This will enhance the efficiency of HR processes and enable real-time data-driven decision-making, ultimately improving organizational agility.
2. Institutions should prioritize continuous training and development programs to improve employees' digital competencies. Equipping staff with the necessary ICT skills will facilitate the effective use of E-HRM systems and support the organization's ability to adapt to technological changes.
3. Management should ensure that E-HRM practices are strategically aligned with ICT adoption initiatives and overall organizational goals. This alignment will maximize the impact of digital HR practices and enable institutions to achieve greater responsiveness, flexibility, and long-term sustainability.

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