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EXAMINING DIGITAL HUMAN RESOURCE PRACTICES IN KARACHI, PAKISTAN: THE INFLUENCE OF TECHNOLOGICAL CHANGE, EMPLOYEE ATTITUDE, AND EMPLOYEE COMPETENCY

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Abstract

This study examines the influence of Technological Change (TC) on Digital Human Resource Practices (DHRP), focusing on the roles of Employee Attitude (EA) and Employee Competency (EC) in Karachi, Pakistan. Data were collected from 244 respondents and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. The findings reveal that Technological Change significantly and positively influences DHRP and Employee Attitude, while Employee Attitude significantly enhances DHRP. Employee Competency significantly moderates the relationship between Employee Attitude and DHRP, but the negative interaction effect does not support the hypothesized positive moderation. The study provides implications for digital HR implementation and future research.

Keywords

Technological Change, Digital Human Resource Practices, Employee Attitude, Employee Competency.

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Introduction

Digital technologies have rapidly evolved and changed the way organizations operate and manage their people. As organizations strive to be efficient, boost employee performance, and stay competitive in the changing landscape of business, a growing number of them are turning to digital solutions for these purposes (Serafimova & Vasilev, 2024). Digital Human Resource Practices (DHRP) is one of these advancements, as it utilizes digital technologies to modernize HR practices, leading to enhanced recruitment, communication, employee services, and HR management (Bahari, 2025; Shiferaw & Birbirsa, 2025). Technological Change (TC) is identified as one of the primary factors contributing to digital transformation, where the implementation of sophisticated technologies, digital platforms, and innovative systems helps to optimize business processes, boost operational efficiency, and meet strategic goals (Trivedi et al., 2023; Obiki-Osafiele et al., 2024). But, the effective practices of digital HR practices also rely on the readiness, willingness and capacity of employees to accept organizational change (Pea-Assounga & Sibassaha, 2024). Thus, it is growing more crucial to understand the factors which impact the success of DHRP in today's organizational context.

In particular, factors related to the employees play a key role in the understanding of how technological investments can be effectively translated into successful digital HR outcomes. The importance of Employee Attitude (EA) in the context of digital transformation is undeniable, as employees who are positive about the organization and the workplace are more likely to be open to digital transformation and actively use digital systems, thereby supporting the efforts of digital transformation in the organization (Bozkus, 2023). Positive employee attitudes can help with the acceptance of technology, minimize resistance to change, and increase employee engagement with digital initiatives, thus improving Digital Human Resource Practices (DHRP) (Zaidi et al., 2026; Chaudhuri et al., 2023). Concurrently, the impact of technological transformation may differ based on the skills of the employees (Patel, 2023). In terms of employees, their knowledge, skills, training, and the use of digital systems reflect their Employee Competency (EC), which enhances the organization's knowledge, skills, and competencies to enable the development of successful HR outcomes (Garem, 2026; Rustam et al., 2024). Competent employees are better equipped to adapt to technological innovations, utilize digital tools effectively, and maximize the benefits of digital HR practices (Albi, 2024). Therefore, technological changes may not be enough to guarantee the effectiveness of DHRP implementation, as employees' attitudes and competencies could be the determining factors in the effectiveness of the transformation of technological opportunities into HR practical outcomes. Empirical studies on Technological change, Employee attitude, Employee competencies and digital human resource practices have not been studied at the same time, especially in developing economies (Pea-Assounga & Sibassaha, 2024; Al-Alawi et al., 2023; Nicolás-Agustín et al., 2021). This accentuates the importance of studying the direct link between technological change and DHRP, as well as the channels by which employee-related factors affect the direct link.

Although digital technologies have been developed and digital solutions increasingly introduced in organisations, achieving effective implementation of Digital HRP continues to be a great challenge (Taher et al., 2025). While companies invest in digital HR technologies, the use of new technologies does not always yield the desired results due to the limited ability of employees to effectively use digital systems and their reluctance to adopt new technology (Bahari, 2025; Shiferaw & Birbirsa, 2025). Although technologic change is seen as one of the main factors driving digital transformation and improving organizational efficiency, the success of digital HR practices relies not just on the advancement of

technology but also on the employees' readiness to accept the change in the organization (Obiki-Osafiele et al., 2024). Previous studies have mainly centered on the impact of technological change on organizational performance and innovation, and the influence of technological change on DHRP has received little attention, especially the mediation of Employee Attitude and the moderation of Employee Competency (Wei et al., 2024). Positive attitudes among employees are more likely to be attached to digital transformation programs, and better digital knowledge and skills would enable them to use digital technologies more effectively to improve the success of digital HR practices, (Zaidi et al., 2026; Chaudhuri et al., 2023). Additionally, empirical investigations that take into account these relationships at the same time are still limited, particularly in developing countries (Pea-Assounga & Sibassaha, 2024; Al-Alawi et al., 2023; Nicolás-Agustín et al., 2021). Hence, this study tackles this research gap by focusing on Technological Change's impact on Digital Human Resource Practices, Technological Change's impact on Employee Attitude, Employee Attitude's impact on DHRP, and the moderating role of Employee Competency in the impact of Employee Attitude on DHRP.

An important contribution of this study is to the literature and organisational practice. The study contributes to the knowledge of digital transformation by examining the relationships among Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices with Employee Attitude as a mediational variable and Employee Competency as a moderation variable. The results could practically benefit HR professionals and managers in promoting the use of technology, decrease resistance to change, and build employee capability to increase the effectiveness of digital HR practices. This study is conducted through a structured questionnaire and a Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the relationships proposed in the model, which is focused on employees in organizations that have either adopted or implemented digital HR technologies.

The thesis consists of five chapters. The study introduces the background, problem statement, objectives, research questions, significance and scope of the study in Chapter 1. The theoretical foundations, literature review, hypotheses and conceptual framework are presented in Chapter 2. Chapter 3 presents the methodology used in the research and the data analysis. The results of the empirical study are presented and discussed in Chapter 4. The Chapter 5 summarizes the findings, implications, and limitations of the study, along with suggestions for future research.

Literature Review

Theoretical Background

Resource-Based View (RBV) Theory: The Resource-Based View (RBV) theory, introduced by Jay Barney, is one of the most influential theories in strategic management. RBV proposes that organizations achieve sustainable competitive advantage by acquiring, developing, and effectively utilizing valuable, rare, inimitable, and non-substitutable (VRIN) resources (Sun et al., 2024; Zvarimwa & Zimuto, 2022). These resources may include tangible assets such as technology and infrastructure, as well as intangible assets such as employee knowledge, skills, capabilities, and organizational culture. According to RBV, organizational success depends not only on possessing valuable resources but also on the organization's ability to integrate and deploy these resources effectively to improve performance (Hsiao, 2023). As technological advancement continues to reshape business operations, organizations increasingly rely on digital technologies and competent human resources to create capabilities that competitors cannot easily imitate (Sharma & Kohli, 2023; Thite, 2020). Therefore, RBV provides a comprehensive framework for

understanding how organizations leverage internal resources to improve operational efficiency, innovation, and long-term competitiveness.

The Resource-Based View provides a strong theoretical foundation for the proposed research model. In this study, Technological Change represents a valuable organizational resource that enables firms to modernize their HR functions and enhance Digital Human Resource Practices (Zhang & Chen, 2023). Employee Attitude reflects an important organizational capability that facilitates employees' acceptance and effective utilization of technological resources, thereby mediating the relationship between Technological Change and Digital Human Resource Practices (Cahyadi et al., 2024; Mollah et al., 2024). Employee Competency represents a strategic human resource consisting of employees' knowledge, skills, and abilities to effectively utilize digital technologies. As a moderating variable, Employee Competency strengthens the influence of Technological Change on Digital Human Resource Practices because competent employees are better able to adapt to technological innovations and maximize their benefits (Rubel et al., 2023; Lubis et al., 2022). Consequently, Digital Human Resource Practices emerge as an organizational capability developed through the effective integration of technological resources and human capital.

The Resource-Based View is adopted in this study because it provides a comprehensive explanation of how internal organizational resources contribute to the successful implementation of Digital Human Resource Practices (Willie, 2024). Unlike theories that focus only on individual technology acceptance or employee behavior, RBV simultaneously recognizes the strategic importance of technological resources and employee capabilities in achieving organizational objectives (Kero & Bogale, 2023). Since this study examines the influence of Technological Change on Digital Human Resource Practices while considering the mediating role of Employee Attitude and the moderating role of Employee Competency, RBV offers the most suitable theoretical lens for explaining these relationships. Therefore, the theory supports the conceptual framework and helps explain how organizations can leverage technological and human resources to strengthen digital HR practices and achieve sustainable competitive advantage.

Hypothesis Development

Technological Change and Digital Human Resource Practices: Technological Change refers to the adoption and integration of advanced digital technologies that improve organizational processes, communication, and operational efficiency (Lu, 2024). It includes the implementation of technologies such as Human Resource Information Systems (HRIS), cloud computing, artificial intelligence, automation, and digital communication platforms that enhance organizational capabilities (Ogbe & Uchechukwu, 2024). According to the Resource-Based View (RBV), technological resources represent valuable organizational assets that can create sustainable competitive advantage when effectively utilized. Organizations that continuously invest in technological innovation are better positioned to improve service quality, streamline HR activities, and respond to changing business environments (Alzadjali et al., 2023).

Digital Human Resource Practices represent the application of digital technologies to perform HR functions such as recruitment, employee communication, training, performance management, and administrative services (Kambur & Yildirim, 2022). Previous studies suggest that technological advancement enables organizations to automate routine HR activities, improve decision-making, enhance employee experiences, and increase overall HR efficiency (Vrontis et al., 2023; Ayanponle et al., 2022).

Organizations equipped with modern technological infrastructure are more capable of implementing effective digital HR practices than those relying on traditional HR systems. As technology continues to evolve, organizations that embrace technological change are more likely to develop efficient, flexible, and responsive HR processes (Sani et al., 2024; Mattajang, 2023). Based on the Resource-Based View, technological resources provide the foundation for developing superior organizational capabilities, including Digital Human Resource Practices.

H1: *Technological Change has a positive and significant effect on Digital Human Resource Practices.*

Technological Change and Employee Attitude: Technological Change involves the continuous introduction and utilization of digital technologies that transform organizational operations and work processes (Hanelt et al., 2020; Vial, 2019). These technological developments simplify job tasks, improve communication, increase efficiency, and provide employees with greater access to organizational information. The Resource-Based View suggests that organizations capable of effectively utilizing technological resources create environments that support employee development and organizational success (Willie, 2024). Employees working in technologically advanced environments often experience improved work processes and greater opportunities for learning and innovation (Ivaldi et al., 2021).

Employee Attitude refers to employees' overall feelings, perceptions, and evaluations regarding their work, organization, and workplace environment (Hoxha et al., 2024). Positive employee attitudes include job satisfaction, organizational commitment, motivation, and willingness to embrace organizational changes (Mansour et al., 2022). Technological advancements that reduce workload, improve collaboration, and enhance work flexibility are likely to generate positive employee attitudes toward both the organization and digital initiatives (Trenerry et al., 2021). Employees who perceive technology as beneficial are generally more willing to support organizational transformation and adapt to new working methods. Therefore, organizations investing in technological change are expected to cultivate more favorable employee attitudes, facilitating successful digital transformation.

H2: *Technological Change has a positive and significant effect on Employee Attitude.*

Employee Competency as a Moderator between Employee Attitude and Digital Human Resource Practices: Employee Competency refers to the knowledge, skills, abilities, and expertise that enable employees to perform their responsibilities effectively, particularly in technology-enabled work environments (Ekhsan et al., 2026). Competent employees possess the capability to understand, utilize, and adapt to digital technologies while continuously improving their professional skills (Sony & Mekoth, 2022). According to the Resource-Based View, employee competency represents a valuable strategic resource that enhances an organization's ability to utilize technological assets effectively and develop sustainable competitive advantage (Silvestri et al., 2023).

Employee Attitude reflects employees' willingness to embrace organizational goals, support technological change, and actively participate in workplace improvements. Although positive employee attitudes encourage the adoption of Digital Human Resource Practices, the effectiveness of these attitudes may depend on employees' competency levels (Pea-Assounga & Sibassaha, et al., 2024). Employees with positive attitudes but limited digital skills may struggle to utilize digital HR systems effectively (Jimoh, 2025). Conversely, employees possessing both positive attitudes and high competency are better equipped to apply digital technologies successfully and contribute to effective Digital Human Resource Practices (Ahmed et al., 2020). Therefore, Employee Competency strengthens the positive relationship

between Employee Attitude and Digital Human Resource Practices by enabling employees to translate favorable attitudes into effective digital behaviors.

H3: *Employee Competency positively moderates the relationship between Employee Attitude and Digital Human Resource Practices.*

Employee Attitude and Digital Human Resource Practices: Employee Attitude refers to employees' positive or negative evaluations of their work environment, organizational practices, and workplace experiences (Kammeyer-Mueller et al., 2023). It encompasses employees' satisfaction, commitment, motivation, pride, and willingness to support organizational objectives. Positive employee attitudes encourage greater engagement, collaboration, adaptability, and acceptance of organizational changes (Radu, 2023). Within the Resource-Based View, employee attitudes represent intangible organizational resources that contribute to the successful utilization of other strategic resources, including digital technologies.

Digital Human Resource Practices rely not only on technological infrastructure but also on employees' willingness to adopt and utilize digital systems effectively. Employees with positive attitudes are more likely to accept digital HR initiatives, actively use digital platforms, participate in technology-based HR activities, and support organizational digital transformation (Meske & Junglas, 2020). Previous research indicates that positive employee attitudes reduce resistance to technological change, improve technology acceptance, and enhance organizational performance (Alabi, 2025). Consequently, organizations that foster positive employee attitudes are expected to experience more successful implementation of Digital Human Resource Practices (Fenwick et al., 2024). Based on these theoretical arguments, a positive relationship between Employee Attitude and Digital Human Resource Practices is proposed.

H4: *Employee Attitude has a positive and significant effect on Digital Human Resource Practices.*

Empirical Review

The empirical studies conducted in recent times reveal that digital transformation is changing the face of HRM, and that effectiveness of digital transformation in HRM is contingent upon both technology and employee aspects. According to Pea-Assounga & Sibassaha (2024), technological change significantly impacts on digital HR practices and employee attitudes, and employee competency, attitudes, and law compliance also positively influences on digital HR practices, in addition, employee attitude partially mediated on the relationship between technological change and digital HR practices. According to Zhang & Chen (2023), the driving forces of digital HR transformation are the needs of the digital world, industry innovation, competition, digital governance, and changes in workplace requirements, with a focus on the issue of organisational change. There are some positive findings, Lou et al. (2024) reported that digital transformation is positively associated with innovative work behaviour and job performance, which are partially mediated by HRM and HR development. In a similar way, Thu et al. (2025) found that digital HRM positively influenced the organizational performance via employee engagement and performance, but the personnel strategy did not significantly moderate this relationship. Simple adoption, training and work flexibility of basic digital technology did not significantly impact productivity, but innovative recruitment, retention, HR analytics and AI, did. The positive impact of digital innovation on employee learning, engagement, and skill development was also noted, but with resistance to change and adaptability of organizations as significant challenges (Mardikaningsih & Wardoyo, 2024). In general,

these studies suggest that digital HR transformation is not only a matter of technology, but also highly dependent on attitudes, skills, and readiness of employees and organizations.

Recent research highlights the significance of the role of employee competencies and supportive digital environments. Shahiduzzaman (2025) identified three themes as digital HRM: Digital transformation, Innovation and performance management and Adaptive HRM, highlighting that digital competencies of the employees, HR capabilities are of the utmost importance for digital maturity. Of the two, Zia et al. (2024) identified digital communication as a significant influence on digital engagement and leadership, which in turn leads to innovative work behaviours, with no significant impact from digital training. In Strategic Partner, Change Agent, Administrative Expert and Employee Champion, Zhang et al. (2024) identified 11 HR competency indicators, which are important for digital competence, strategic thinking and change management. Duan et al. (2024) also found that digital technologies have a positive impact on employee performance by providing effective communication, coordination, knowledge sharing, and decision-making. Regardless of this, the few studies that have jointly investigated Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices have lacked a focus on Employee Attitude as a mediation variable and Employee Competency as a moderation. The present study is based on this gap particularly in developing country context.

Conceptual Framework

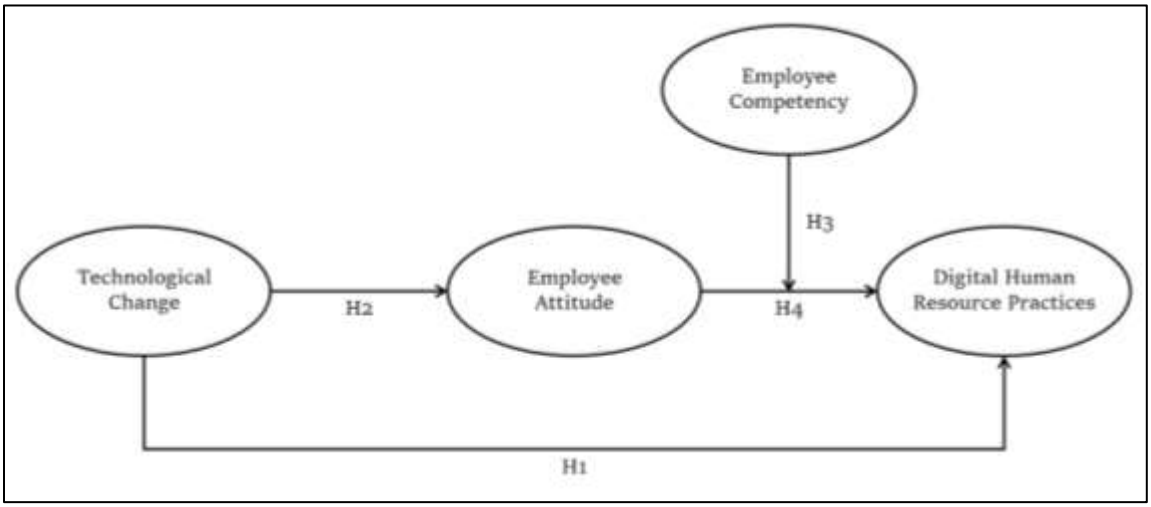


Figure 1: Conceptual Model

Introduction

This chapter presents the research methodology adopted to examine the impact of Technological Change on Digital Human Resource Practices among organizations in Karachi, Pakistan. It describes the research approach, research purpose, research design, research philosophy, study setting, unit of analysis, target population, sample size, and data collection procedures. Furthermore, it explains the sampling technique, measurement instrument, and statistical analysis employed to empirically examine the relationships among Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices. The methodology provides a systematic framework to ensure the validity and reliability of the study findings.

Research Approach

This study adopts a quantitative research approach because it enables the collection of measurable data through structured questionnaires and facilitates statistical testing of the proposed hypotheses (Lim, 2024). A quantitative approach is appropriate for examining the relationships among Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices. The study follows a deductive approach, where hypotheses are developed based on the Resource-Based View (RBV) theory and empirically tested using survey data. The quantitative approach provides objective evidence regarding the direct and moderating relationships proposed in the conceptual framework.

Research Purpose

The purpose of this research is explanatory, as it seeks to examine the causal relationships among Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices (Thomas & Zubkov, 2023). Specifically, the study investigates whether Technological Change enhances Digital Human Resource Practices directly and indirectly through Employee Attitude while examining whether Employee Competency strengthens the relationship between Employee Attitude and Digital Human Resource Practices. The findings are expected to contribute to both theoretical understanding and practical implementation of digital HR initiatives.

Research Design

This study employs a correlational research design to investigate the relationships among Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices (Ghanad, 2023). The design is appropriate because it enables the examination of direct and moderating relationships without manipulating the study variables (Ge, 2023). The proposed conceptual framework is tested using Partial Least Squares Structural Equation Modeling (PLS-SEM), which is suitable for analyzing complex relationships involving moderation effects.

Research Philosophy

The study follows the positivist research philosophy, which assumes that relationships among variables can be objectively measured and statistically verified (Ali, 2024). Structured questionnaires are used to collect quantitative data, while statistical techniques are employed to examine the proposed hypotheses (Kircher & Zipp, 2022). The positivist paradigm is appropriate because the study seeks to establish empirical evidence regarding the effects of Technological Change, Employee Attitude, and Employee Competency on Digital Human Resource Practices.

Target Population

The target population consists of HR employees working in organizations located in Karachi, Pakistan, that have adopted or are utilizing digital human resource technologies. Employees from both public and private sector organizations are included because they actively interact with digital HR systems and possess sufficient knowledge to evaluate technological change, employee attitudes, employee competency, and Digital Human Resource Practices. The study includes employees aged 18 years and above from different educational and professional backgrounds to ensure diverse perspectives.

Sample Size

The minimum sample size for this study was determined using the Daniel Soper A-priori Sample Size Calculator. Based on the proposed research model, statistical power requirements, and significance level, a minimum of 137 respondents was required. To improve the reliability and generalizability of the findings, 260 valid questionnaires were collected and 244 used for data analysis.

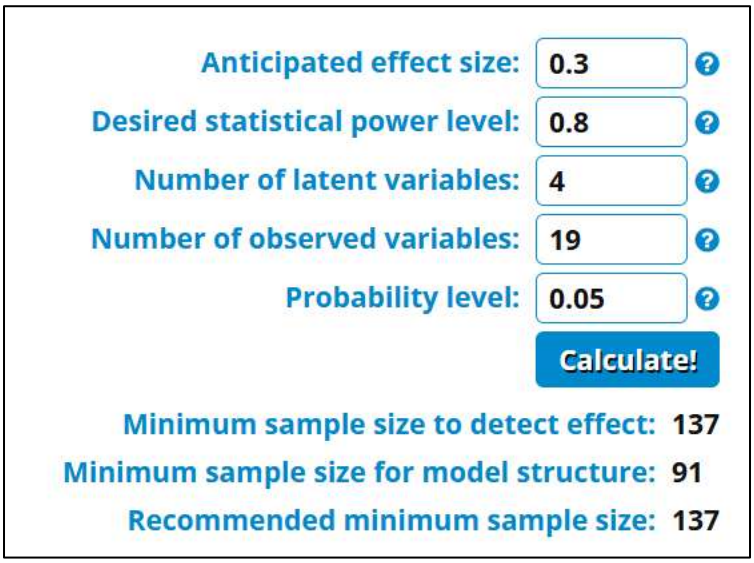


Figure 2: Daniel Soper A-priori Sample Size Calculator

Data Collection Method

Primary data were collected through a structured questionnaire adapted from previously validated studies. The questionnaire consists of items measuring Technological Change, Employee Attitude, Employee Competency, and Digital Human Resource Practices. Responses were recorded using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The questionnaire was distributed among employees working in organizations across Karachi using a convenience sampling technique. After screening for completeness and consistency, the valid responses were analyzed using SmartPLS to test the proposed hypotheses and conceptual framework.

Statistical Technique

The collected data will be analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS 4. PLS-SEM is appropriate for testing complex research models involving direct and moderating relationships among latent constructs (Becker et al., 2023; Hair & Alamer, (2022). The analysis will be conducted in two stages. First, the measurement model will be assessed by examining indicator reliability, internal consistency reliability, convergent validity, and discriminant validity. Second, the structural model will be evaluated using path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping to test the significance of the proposed hypotheses. This technique provides robust and reliable estimates for theory testing and prediction.

Data Analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyze the data, which was based on 244 valid responses. This approach was chosen as it is suitable for small-to-medium size samples and complex models.

Data Screening

The integrity, accuracy, and quality of the data were ensured through a thorough data screening process prior to hypothesis testing, which is crucial for producing valid and reliable research findings.

Missing Value and Outlier

A total of 260 responses were collected and screened using SPSS before conducting the statistical analysis. The data were carefully examined for missing values, univariate outliers, and multivariate outliers to ensure data quality. No missing values were identified, indicating that all questionnaires were complete. However, four univariate outliers and twelve multivariate outliers were detected during the screening process. These outlying cases were removed from the dataset, resulting in a final sample of 244 valid responses for further analysis. The data cleaning process ensured that the dataset met the assumptions required for subsequent statistical procedures, thereby enhancing the accuracy, reliability, and credibility of the study's findings.

Descriptive Analysis

Composition of Data: Table 1 presents the demographic profile of the 244 respondents included in the study. The gender distribution indicates that the majority of participants were male (75.5%, n = 184), while females represented 24.5% (n = 60). Regarding age, most respondents were between 18 and 25 years (59%), followed by those aged 25–35 years (32.7%). Only a small proportion belonged to the 35–45 years (6.6%) and 46 years and above (1.7%) age groups. In terms of education, most participants held a bachelor's degree (62.3%), followed by a master's degree (24.5%) and higher education qualifications (13.2%). No respondents selected the "Other" education category. Overall, the sample primarily consisted of young, well-educated male participants.

Table 1: Demographic Profile

		Frequency	Percentage
Gender	Male	184	75.50%
	Female	60	24.50%
Age Group	18 - 25 years	144	59%
	25 - 35 years	80	32.70%
	35 - 45 years	16	6.60%
	46 and above	4	1.70%
Education Level	Higher Education	32	13.20%
	Bachelor's Degree	152	62.30%
	Master's Degree	60	24.50%
	Others	0	-

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Data Analysis through PLS-SEM

The hypotheses were tested using SmartPLS 4's Partial Least Squares Structural Equation Modeling (PLS-SEM), which is adaptable and capable of handling non-normal data without strict parametric assumptions (Hair et al., 2020).

Outer Measurement Model: The outer measurement model was used to test the validity and reliability of the latent construct with its observed items (Hair et al, 2021). This study was suitable for the use of PLS-SEM, as it was able to use complex models that contained mediating effects. Exploratory Factor Analysis (EFA) verified that each indicator was valid in measuring its construct, which gave added validity and precision to the measurement model.

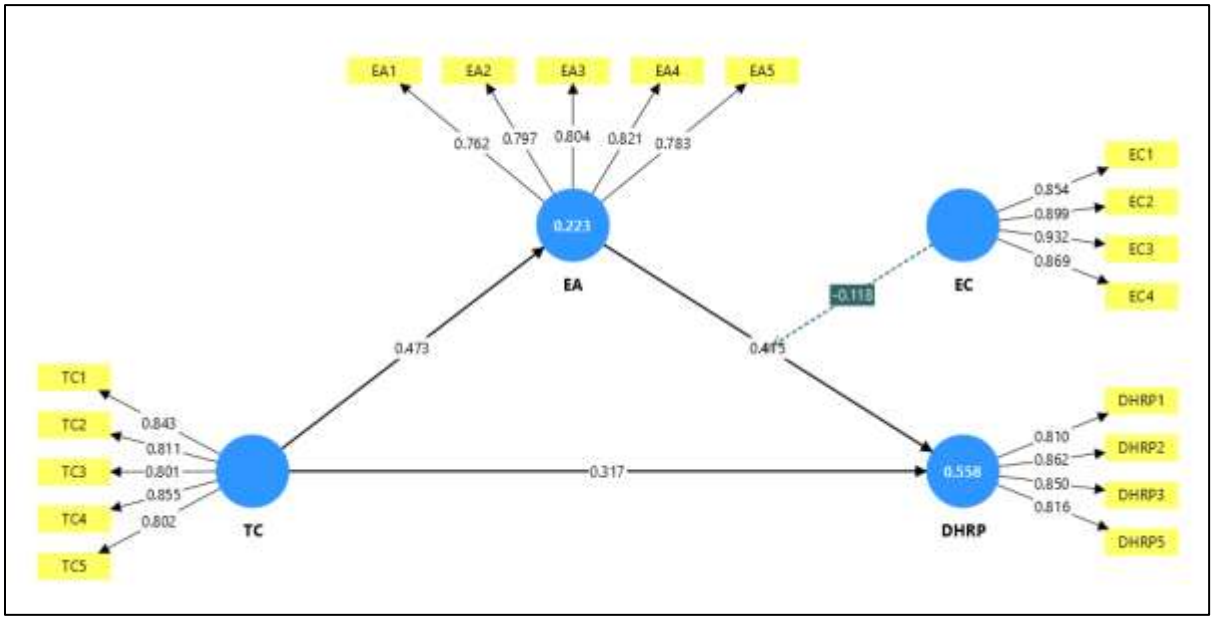


Figure 3: Measurement of Outer Model

Reliability and Validity Testing: Table 2 presents the results of the reliability and convergent validity assessment for all study constructs. Convergent validity was evaluated using indicator loadings, Composite Reliability (CR), Average Variance Extracted (AVE), and Cronbach's alpha. The results demonstrate that all measurement items achieved factor loadings above the recommended threshold of 0.70, ranging from 0.762 to 0.932, indicating that each indicator adequately represents its respective construct. Digital Human Resource Practices (DHRP) showed loadings between 0.810 and 0.862, Employee Attitude (EA) between 0.762 and 0.821, Employee Competency (EC) between 0.854 and 0.932, and Technological Change (TC) between 0.801 and 0.855.

The Composite Reliability values ranged from 0.895 to 0.938, all exceeding the recommended minimum value of 0.70, demonstrating strong internal consistency among the measurement items. Similarly, the AVE values varied from 0.630 to 0.790, surpassing the threshold of 0.50, confirming that each construct explains more than half of the variance in its indicators and therefore possesses satisfactory convergent validity. Furthermore, Cronbach's alpha values ranged from 0.853 to 0.912, which are well above the acceptable level of 0.70, indicating high reliability of the constructs. Among all variables, Employee Competency exhibited the highest reliability and convergent validity, with a CR of 0.938, an AVE of 0.790,

and a Cronbach's alpha of 0.912. Overall, the findings confirm that the measurement model demonstrates excellent reliability and convergent validity, supporting the suitability of the constructs for subsequent structural model analysis.

Table 2: Reliability and Validity

	Items	Loadings	CR	AVE	Alpha
Digital Human Resource Practices	DHRP1	0.81	0.902	0.697	0.855
	DHRP2	0.862			
	DHRP3	0.85			
	DHRP5	0.816			
Employee Attitude	EA1	0.762	0.895	0.63	0.853
	EA2	0.797			
	EA3	0.804			
	EA4	0.821			
	EA5	0.783			
Employee Competency	EC1	0.854	0.938	0.79	0.912
	EC2	0.899			
	EC3	0.932			
	EC4	0.869			
Technological Change	TC1	0.843	0.913	0.677	0.882
	TC2	0.811			
	TC3	0.801			
	TC4	0.855			
	TC5	0.802			

Discriminant Validity: Discriminant validity is an assessment of the ability of each item to differentiate between constructs (Cheung et al., 2023). In this study, discriminant validity was assessed using three methods. To ensure the loading of each item on its assigned build was at least 0.1 higher than its loadings on other construction, cross-loadings were first analyzed as suggested by Chin & Yao (2023). Second, the Fornell-Larcker criterion (1981) was employed to validate the square root of the Average Variance Extracted (AVE) of each construct was greater than the correlation of each construct with other constructs. Discriminant validity was finally tested by comparing the HTMT (Heterotrait-Monotrait) ratio. Based on the recommended values by Henseler et al. (2014), all values were below 0.85.

Table 3 presents the discriminant validity assessment using the Fornell–Larcker criterion. According to this criterion, the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with other constructs. The diagonal values represent the square roots of the AVE, with DHRP (0.835), EA (0.794), EC (0.889), and TC (0.823). All diagonal values are higher than the corresponding inter-construct correlations, confirming that each construct shares more variance with its own indicators than with other constructs. These findings demonstrate satisfactory discriminant validity, indicating that Digital Human Resource Practices, Employee Attitude, Employee Competency, and Technological Change are empirically distinct constructs and adequately measure different theoretical concepts.

Table 3: Discriminant Validity by using Fornell and Larcker (1981) criterion				
	DHRP	**EA**	**EC**	**TC**
DHRP	0.835			
EA	0.639	0.794		
EC	0.414	0.269	0.889	
TC	0.576	0.473	0.265	0.823

Table 4 reports the cross-loading analysis used to further assess discriminant validity. The results indicate that every measurement item loads highest on its intended construct compared to all other constructs. Specifically, DHRP items load between 0.810 and 0.862 on Digital Human Resource Practices, EA items between 0.762 and 0.821 on Employee Attitude, EC items between 0.854 and 0.932 on Employee Competency, and TC items between 0.801 and 0.855 on Technological Change. The interaction term (EC × EA) also loads highest on its own construct (1.000). Since each indicator exhibits substantially higher loadings on its assigned construct than on other constructs, the results confirm adequate discriminant validity and demonstrate that the measurement items accurately represent their respective latent variables.

Table 4: Cross-Loading					
	DHRP	**EA**	**EC**	**TC**	**EC x EA**
DHRP1	0.81	0.514	0.295	0.444	0.106
DHRP2	0.862	0.596	0.24	0.442	0.052
DHRP3	0.85	0.535	0.323	0.508	-0.073
DHRP5	0.816	0.491	0.509	0.522	-0.165
EA1	0.543	0.762	0.26	0.249	0.119
EA2	0.542	0.797	0.181	0.417	0.072
EA3	0.445	0.804	0.065	0.31	0.001
EA4	0.51	0.821	0.256	0.487	-0.18
EA5	0.491	0.783	0.29	0.38	-0.172
EC1	0.276	0.186	0.854	0.283	0.392
EC2	0.388	0.227	0.899	0.236	0.319
EC3	0.355	0.223	0.932	0.272	0.343
EC4	0.423	0.3	0.869	0.173	0.195
TC1	0.497	0.494	0.155	0.843	0.051
TC2	0.541	0.434	0.201	0.811	0.113
TC3	0.429	0.291	0.354	0.801	0.07
TC4	0.458	0.338	0.181	0.855	-0.047
TC5	0.42	0.345	0.231	0.802	0.006
EC x EA	-0.03	-0.046	0.34	0.051	1

Table 5 presents the Heterotrait–Monotrait Ratio (HTMT), which provides an additional assessment of discriminant validity. According to Henseler et al. (2014), HTMT values should remain below the recommended threshold of 0.85 to establish adequate discriminant validity. The results show that all HTMT values range from 0.074 to 0.747, which are well below the recommended limit. The highest HTMT

value is observed between Digital Human Resource Practices and Employee Attitude (0.747), while the remaining values indicate even lower correlations among the constructs. These findings confirm that all constructs are empirically distinct and that there is no issue of multicollinearity or overlap between the latent variables. Overall, the HTMT results provide strong evidence of satisfactory discriminant validity.

Table 5: Heterotrait-Monotrait Ratio (HTMT)

	DHRP	EA	EC	TC	EC x EA
DHRP					
EA	0.747				
EC	0.454	0.295			
TC	0.653	0.522	0.311		
EC x EA	0.128	0.149	0.368	0.074	

Hypothesis Testing: After validating the measurement model, the structural model was assessed using SmartPLS 4 based on data collected from 244 respondents. The results indicate that Technological Change (TC) has a significant positive effect on Digital Human Resource Practices (DHRP) ($\beta = 0.317$, $t = 5.724$, $p < 0.001$), supporting H1. TC also significantly enhances Employee Attitude (EA) ($\beta = 0.473$, $t = 9.394$, $p < 0.001$), supporting H2. Furthermore, EA has a significant positive influence on DHRP ($\beta = 0.415$, $t = 7.237$, $p < 0.001$), supporting H4. The interaction effect of EC × EA on DHRP is statistically significant but negative ($\beta = -0.118$, $t = 2.483$, $p = 0.013$). Although the interaction effect is statistically significant, its negative coefficient does not support the hypothesized direction of H3. Therefore, H3 is rejected. Overall, three hypotheses (H1, H2, and H4) are supported, while H3 is rejected based on the structural model results.

Table 6: Inner Model Results

Hypothesis No.	Hypothesized Effect	Coefficients	T-values	P-values	Decision
H1	TC -> DHRP	0.317	5.724	0	Accepted
H2	TC -> EA	0.473	9.394	0	Accepted
H3	EC x EA -> DHRP	-0.118	2.483	0.013	Rejected
H4	EA -> DHRP	0.415	7.237	0	Accepted

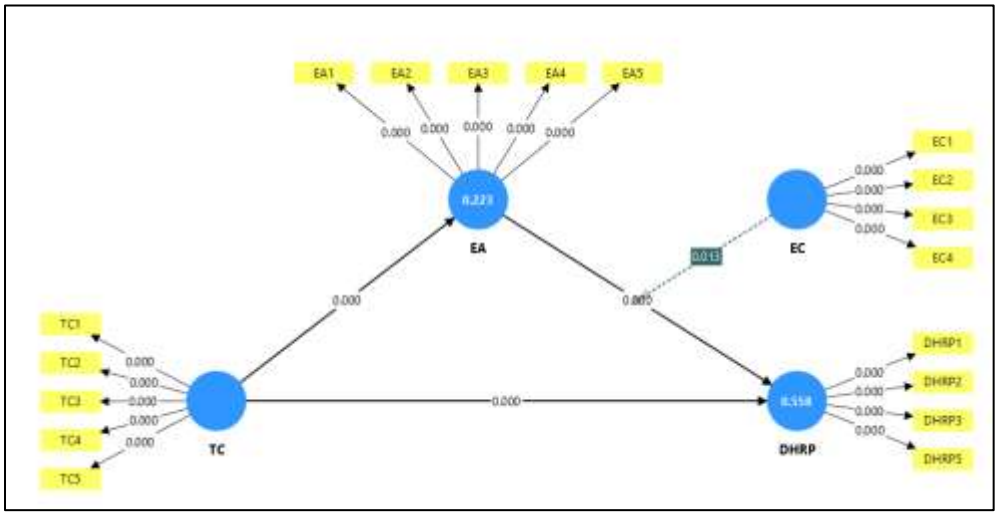


Figure 4: Hypothesis Testing after Bootstrapping

Predictive Power: Table 7 presents the predictive power of the structural model using the R^2 and adjusted R^2 values. The results indicate that Digital Human Resource Practices (DHRP) has an R^2 value of 0.558 and an adjusted R^2 value of 0.551, suggesting that 55.8% of the variance in DHRP is explained by its predictor variables. According to the guidelines of Hair et al. (2020), this represents moderate to substantial explanatory power. Similarly, Employee Attitude (EA) has an R^2 value of 0.223 and an adjusted R^2 value of 0.220, indicating that 22.3% of its variance is explained by Technological Change (TC). Since both R^2 values exceed the recommended threshold of 0.10, the structural model demonstrates satisfactory predictive capability and adequate explanatory power for the endogenous constructs.

Table 7: Predictive Quality Indicators of the Model

	R-square	R-square adjusted
DHRP	0.558	0.551
EA	0.223	0.22

Discussion of Results

The findings indicate that Technological Change has a significant positive effect on Digital Human Resource Practices ($\beta = 0.317$, $p < 0.001$). This suggests that organizations introducing advanced digital technologies are more capable of implementing digital HR systems and improving HR efficiency. As organizations invest in technologies such as HRIS, cloud-based platforms, and automation, HR processes become more integrated, transparent, and responsive. This finding supports the Resource-Based View (RBV), which argues that technology is a valuable organizational resource that enhances operational capabilities when effectively utilized. Therefore, organizations undergoing technological change are more likely to strengthen their Digital Human Resource Practices.

The results also reveal that Technological Change positively influences Employee Attitude ($\beta = 0.473$, $p < 0.001$). This implies that technological improvements create a more supportive and efficient work environment, leading employees to develop more favorable attitudes toward their organization. Modern technologies reduce repetitive tasks, improve communication, increase flexibility, and provide better access to organizational resources. When employees perceive technology as beneficial rather than burdensome, they become more motivated, satisfied, and willing to support organizational initiatives. Consequently, organizations that successfully manage technological change can foster positive employee attitudes that facilitate digital transformation.

Employee Attitude was also found to have a significant positive effect on Digital Human Resource Practices ($\beta = 0.415$, $p < 0.001$). Employees with positive attitudes are generally more receptive to organizational changes and are more willing to adopt digital HR systems. They actively participate in digital training, utilize online HR platforms, and support technology-driven HR initiatives. Positive attitudes also reduce resistance to change and encourage employees to explore new digital tools, thereby improving the effectiveness of Digital Human Resource Practices. This finding highlights that successful digital transformation depends not only on technological resources but also on employees' willingness to embrace organizational change.

Interestingly, Employee Competency produced a significant negative moderating effect on the relationship between Employee Attitude and Digital Human Resource Practices ($\beta = -0.118$, $p = 0.013$). Although the moderation effect is statistically significant, it operates in the opposite direction of the

proposed hypothesis. This suggests that as employee competency increases, the positive influence of employee attitude on Digital Human Resource Practices becomes weaker. One possible explanation is that highly competent employees often rely on their existing expertise and established work routines rather than their attitudes when performing their jobs. They may also critically evaluate newly introduced digital HR systems and be less influenced by positive attitudes if they perceive the systems as adding little value to their work. Another explanation is that competent employees tend to be more independent and require less motivational influence to perform effectively. As a result, employee attitude becomes less important in determining the successful use of Digital Human Resource Practices. This finding suggests that competency alone does not guarantee stronger digital transformation outcomes and that organizations should complement employee competency with effective change management, continuous digital learning, and user-centered system design.

Conclusion

This study examined the influence of Technological Change on Digital Human Resource Practices (DHRP), with Employee Attitude serving as a mediator and Employee Competency acting as a moderator. Guided by the Resource-Based View (RBV), the study aimed to explain how technological resources and employee-related factors contribute to the successful implementation of digital HR practices. Primary data were collected from 244 respondents, and Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS 4 was employed to test the proposed hypotheses.

The findings confirmed that Technological Change significantly enhances Digital Human Resource Practices both directly and indirectly through Employee Attitude. Organizations that invest in digital technologies create more efficient HR systems while simultaneously fostering positive employee attitudes toward digital transformation. Positive employee attitudes encourage employees to accept digital HR initiatives, actively participate in technology-enabled HR processes, and support organizational change, thereby strengthening the implementation of DHRP.

Contrary to expectations, Employee Competency exhibited a significant negative moderating effect on the relationship between Employee Attitude and Digital Human Resource Practices. This suggests that higher competency does not necessarily strengthen the influence of positive employee attitudes on digital HR adoption. Highly competent employees may rely more on their existing expertise and established work practices, reducing the additional contribution of employee attitude to DHRP implementation. This finding highlights that digital transformation requires more than technical competence; organizations must also ensure that competent employees remain engaged with evolving digital HR systems through continuous learning and effective change management.

Overall, the study contributes to the growing literature on digital human resource management by demonstrating the importance of technological advancement and employee attitudes in facilitating successful digital HR implementation. The findings also extend the Resource-Based View by emphasizing that technological resources and human capabilities must be effectively integrated to achieve organizational benefits. These insights provide practical guidance for organizations seeking to strengthen their digital transformation strategies while highlighting the need to balance technological investment with employee development and organizational support.

Recommendations

Based on the findings of this study, several practical recommendations are proposed for organizations seeking to strengthen Digital Human Resource Practices.

First, organizations should continue investing in modern HR technologies such as Human Resource Information Systems (HRIS), cloud-based platforms, artificial intelligence, and automated HR processes. However, technology implementation should be accompanied by clear communication regarding its objectives and benefits to reduce employee uncertainty and increase acceptance.

Second, management should actively foster positive employee attitudes toward digital transformation. This can be achieved through regular communication, employee involvement in technology-related decisions, recognition of employee contributions, and transparent change management initiatives. Employees who understand the value of digital HR systems are more likely to support their successful implementation.

Third, organizations should provide continuous digital training and professional development programs. Rather than assuming that competent employees will automatically adopt new technologies, organizations should regularly update employees' digital knowledge through workshops, certifications, simulations, and hands-on learning opportunities. Continuous learning ensures that employee competencies remain aligned with rapidly evolving technologies.

Fourth, HR managers should establish structured change management programs before introducing new digital HR systems. These programs should include user training, technical support, pilot testing, feedback mechanisms, and post-implementation evaluations to identify operational challenges and improve user experiences.

Finally, organizations should continuously monitor employee perceptions of digital HR practices through surveys, interviews, and performance reviews. Employee feedback should be incorporated into future system improvements to ensure that digital HR initiatives remain user-friendly, efficient, and aligned with organizational objectives. By integrating technological investment with employee engagement, continuous learning, and effective change management, organizations can maximize the benefits of Digital Human Resource Practices and improve long-term organizational performance.

Future Research Directions

Future research can extend this study by incorporating additional organizational and individual factors that may influence Digital Human Resource Practices, such as digital leadership, organizational culture, employee readiness for change, digital literacy, organizational support, and innovation capability. Researchers may also examine other mediating and moderating variables to gain a deeper understanding of the mechanisms through which technological change affects digital HR practices. Future studies should also address the limitation of convenience sampling by using probability-based sampling techniques to improve the representativeness of the sample and enhance the generalizability of the findings across broader organizational contexts. Additionally, future studies should consider conducting comparative research across different industries, organizational sizes, and countries to determine whether the observed relationships remain consistent in diverse organizational and cultural contexts. Since this study

found a significant negative moderating effect of Employee Competency, future researchers are encouraged to investigate the reasons underlying this unexpected relationship through qualitative research, particularly interview-based studies. Qualitative interviews with highly competent employees could provide deeper insights into why employee competency may weaken the relationship between employee attitudes and the adoption of Digital Human Resource Practices. Such investigations could help explain the underlying perceptions, experiences, and organizational factors contributing to this negative moderating effect and provide a more comprehensive understanding of the relationship. Mixed-method research may also be employed to combine these qualitative insights with quantitative evidence and further refine existing theoretical explanations.

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