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Digital Human Resource Management And Organizational Performance: The Mediating Role Of Employee Engagement And The Moderating Role Of Digital Competence In Pakistan

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Abstract

Purpose: The research will investigate how the digital human resource management (Digital HRM) practices affect the performance of organizations in the service industry in Pakistan. In particular, it examines how the employee engagement mediates this relationship and how digital competence moderates this relationship.

Design/Methodology/Approach: Cross-sectional survey design was used and the approach applied was quantitative. The sample population was comprised of 450 employees who were employed in digitally transformed organizations of the banking, telecommunications, and information technology sectors in Pakistan. The hypothesized relationships were tested using Structural Equation Modelling (SEM) with AMOS version 26. Confirmatory Factor Analysis (CFA) was applied to test the measurement model and bootstrapping methods were used to test the mediation and moderation effect**s.**

Findings: The findings have shown that Digital HRM practices have a significant positive impact on the engagement of the employees ($b = 0.42$, $p < .001$) and the organizational performance ($b = 0.37$, $p < .001$). The engagement of the employees showed a positive association with the performance of the organization ($b = 0.45$, $p < .001$). Notably, the Digital HRM and organizational performance were strongly connected through employee engagement. Moreover, the relationship between Digital HRM and employee engagement was also moderated significantly by the digital competence (interaction effect $b = 0.18$, $p < .05$), meaning that the beneficial impact of Digital HRM on engagement is reinforced, in case the employee has a high level of digital competence.

Practical Implications: This research has practical implications on HR managers, organizational leaders and policymakers in emerging economies. To maximize the effects of engagement and performance, organizations should invest in the development of digital competencies among employees and introduce Digital HRM systems to improve the results. The priorities should be training programs aimed to improve digital skills to ensure the maximum use of digital HR tools.

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Theoretical Contributions: The paper contributes to the Digital HRM literature by bringing an integrated model to the test in an under-researched environment of an emerging economy. It adds to the Resource-Based View theory by showing that Digital HRM practices can be used as strategic resources that foster the performance of an organization by engaging the employees. The definition of digital competence as a boundary condition contributes to the knowledge of influencing Digital HRM to the greatest effect.
Originality/Value: This is one of the first papers to study the mediating effect of employee engagement and moderating effect of digital competence in the Digital HRM-performance relationship in the context of the service sector in Pakistan, and therefore it has a distinct contribution to the literature based on the emerging economy approach**.**

Keywords: Digital Human Resource Management, Employee Engagement, Organizational Performance, Digital Competence, Pakistan, Service Industry, Structural Equation Modeling**.**

INTRODUCTION

Background of the Study

The Fourth Industrial Revolution has essentially altered the human resource management environment in all organizations throughout the world. Digital transformation, which is the use of digital technologies in all business spheres, has affected the way organizations handle their most valuable resource, human capital (Schwab, 2017). Digital Human Resource Management (Digital HRM) is the embodiment of this paradigm shift and it involves the use of digital technologies to perform an HR operation such as recruiting, training and development, performance management, compensation, and employee relations (Bondarouk and Brewster, 2016). The potential benefits of this technological integration are increased efficiency, a data-driven decision-making process, better employee experiences, and HR functions into the service of organizational goals (Marler and Fisher, 2013).

Digital HR systems are well researched in developed economies, and studies have shown that they have a positive contribution to several organizational performances (Stone et al., 2015; Parry and Tyson, 2011). The empirical data in the emerging economies, especially the South Asian environment, such as Pakistan, are, however, still very scarce (Malik et al., 2020). This research gap is problematic due to the possibility that the adoption, implementation, and effectiveness of digital HRM can vary significantly in terms of economic, cultural, and institutional contexts (Bondarouk et al., 2017).

Context of Pakistan

There are a number of reasons that make Pakistan a good country to explore Digital HRM. First, it has experienced a high rate of digital transformation over the last few years especially in the service sector of the country. Banking has been highly digitized as significant banks have developed a comprehensive HR information system, digital

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recruitment system, and e-learning system (State Bank of Pakistan, 2023). The digital HR has also been adopted in the telecommunications sector, where major industry players like Jazz, Telenor, and Zong are the leading players. It is natural that information technology companies are on the runway of digital implementation, and they have incorporated the latest HR technologies into their workflows (Pakistan Software Export Board, 2024).

Second, the population structure of the workforce in Pakistan is distinctive. The country has a young and more digitally native workforce with about 64 percent of the population being below the age of 30 (Pakistan Bureau of Statistics, 2023). This demographic trait is a possible factor that will support the integration and implementation of digital HR systems. Nonetheless, there are major differences in digital literacy and competence among the workforce, and it presents an interesting environment to analyze the boundary conditions of Digital HRM effectiveness.

Third, there is an emerging competition in the business environment in Pakistan, both within the country and in terms of global integration. The pressure on organizations to deliver more efficiency, less costs and greater performance is a challenge that digital HRM claims to offer solutions to (Khilji, 2012). Regardless of these tendencies, there is limited systematic empirical research on the results of Digital HRM in Pakistan.

Research Problem

Although digital HR practices have been extensively applied in the service industry of Pakistan, it is still unable to answer some important questions. First, does Digital HRM investment result in the actual improvement of organizational performance? Although the theoretical explanation is of positive impact, there is no empirical validation of the same in the Pakistani context. Second, how does Digital HRM affect performance? Both theoretical and practical intervention design require an understanding of the mediating processes. Third, do the impact of Digital HRM apply to all employees, or do they vary, depending on personal features, like digital competence? This question is an essential boundary question resolving when Digital HRM is most efficient.

Lack of evidence based solutions to these questions gives HR managers and organizational leaders in Pakistan no empirical guidance when it comes to making decisions regarding digital investment in HR. This disparity can lead to an under-optimal allocation of resources, difficulties in implementation, and the inability to exploit the full potential of the digital HR systems..

Research Objectives

The following are research objectives that drive this study:

To check the immediate impact of Digital HRM practices on employee engagement in the service sector in Pakistan.

To explore a direct relationship between Digital HRM practices and organizational performance

To determine the association between the level of employee engagement and organizational performance

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To find out whether employee engagement is a mediating factor between Digital HRM and organizational performance
To determine the effect of digital competence on the relationship between Digital HRM and employee engagement

Research Questions

The research questions to be dealt with in the study are as follows:
How are the Digital HRM practices affecting employee engagement in the Pakistani service sector organisations?
What is the effect of HRM practices Digital on organizational performance?
Does employee engagement influence the performance of the organization?
Does employee engagement mediate between Digital HRM and organizational performance relationship?
Does digital competence mediate the appreciation of Digital HRM on employee engagement?

Significance of the Study

Theoretical Significance

There are a number of theoretical contributions in this study. First, it builds upon Digital HRM studies with a little-researched emerging economy environment, challenging the applicability of the research to other environments. Second, it incorporates Resource-Based View (Barney, 1991), Technology Acceptance Model (Davis, 1989) as well as Human Capital Theory (Becker, 1964) to offer a unified theoretical methodology that will be used to explain Digital HRM results. Third, the focus on employee engagement as a mediating mechanism helps to shed light on the psychological mechanisms whereby technological interventions can be converted into performance results. Fourth, digital competence as a moderator is investigated, which provides knowledge of the boundary conditions that can promote or limit the effectiveness of Digital HRM.

Practical Significance

This research has been the evidence-based research on digital HR investments, which can guide HR practitioners and organizational leaders in Pakistan and other emerging economies. The results guide resource distribution, training agenda and strategy. The role of employee engagement as a mediator suggests the necessity to consider the psychological conditions of employees when it comes to the digital transformation process. The digital competence moderating effect emphasizes the necessity of simultaneous investment in both technology and human possibilities-another important fact of executive talent development plans.

Policy Significance

This study provides policymakers who are interested in the development of the workforce and the productivity of an organization with information on the circumstances in which a digital HR investment would produce the best rewards. The

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results can be used in digital skills policy, stimulation of the use of technologies, and training of the workforce**.**

Structure of the Paper

This part of the paper is followed in the following manner. Section 2 contains a critical overview of the literature available and constructs the theoretical framework and hypotheses. Section 3 explains how the research will be done or its research design, sampling, measures, and analytical processes. Section 4 contains the findings of the analysis of data, measurement model evaluation and testing hypotheses. Section 5 presents the discussion of findings in terms of accepted literature and theoretical conceptualization. Section 6 has the theoretical contribution and practical implications. Section 7 is about limitations and recommends future research recommendations. Section 8 concludes the paper.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Digital Human Resource Management (Digital HRM)

Conceptual Foundations

Digital Human Resource Management is the use of digital technologies to facilitate and support HR activities, processes and strategies (Bondarouk & Brewster, 2016). This is developed out of the previous names e-HRM (electronic Human Resource Management) and virtual HRM, which are the result of enhanced sophistication and convergence of digital technologies on HR functions (Strohmeier, 2007). Digital HRM is not only the digitalization of the current HR practices, but also the fundamental change in the way HR provides services, the way its employees engage with HR functions, and the role that HR plays in achieving the strategic objectives of the organization (Marler and Fisher, 2013).

Digital HRM is applicable in the full-life cycle of employees including:

Digital Recruitment and selection On-line job portals, social media recruitment, applicant tracking systems, artificial intelligence-based candidate screening, and digital assessment tools that enable recruitment procedures to be more efficient and reach a wider talent pool (Holm, 2012; Khatoon et al., 2025).

E-learning: E-learning platforms, virtual classes, learning management systems, micro-learning applications, and personalized learning paths that can provide skills development opportunities on a continuous basis (Sakib et al., 2025).

Digital Performance Management: Automated performance appraisal systems, real-time feedback systems, goal-setting and tracking systems, performance insights, based on analytics (Stone et al., 2015).

Human Resource Information systems (HRIS): Database type, where employee data is centralized, which supports reporting and data analytics and allows taking HR decisions based on data (Bondarouk et al., 2017).

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Digital Employee Engagement: Internal communication platforms, employee portal, pulse survey tool, and recognition systems are used to help employees feel connected and engaged (Stachova et al., 2024).

Evolution of Digital HRM

Digital HRM can be developed in three development phases. The initial stage was operational Digital HRM, which aimed at automating the routine administration procedures to enhance efficiency and minimize costs (Ruel et al., 2004). Major targets included payroll procedures, time keeping and rudimentary record-keeping. The second stage was relational Digital HRM, which focused on enhancing employee services and communication by using intranets, self-service portals and online benefits administration (Lepak and Snell, 1998). The third and the present stage, transformational Digital HRM is a stage that sets digital technologies as the facilitators of strategic HR contribution, such as talent analytics, strategic workforce planning and evidence-based HR decision-making (Marler and Fisher, 2013).

HRM Digital in the Emerging Economies

Digital HRM studies in emerging economies have received an impetus over the past few years, but are still disproportionately underrepresented compared to those on developed economies (Malik et al., 2020). Indian research has investigated the use of e-HRM in multinationals (Sareen and Subramanian, 2020). Studies of China have investigated the connection between digital HR practices and innovation performance (Zhang et al., 2022). The research in the Middle East has examined the obstacles to the implementation of e-HRM in organizations under the public sector (Abu-Shanab and Al-Tarawneh, 2020).

Nonetheless, there is limited research on Pakistan, in particular. Only several studies have explored the use of technology in Pakistani organizations (Qureshi et al., 2021), but no extensive research has been done on the results of Digital HRM. This is especially a major gap considering the special cultural, economic and institutional setting of Pakistan. The cultures of the organizations in Pakistan are with the collectivist cultural framework (Hofstede, 2001), in which the strength of relationships and social bonds is essential. The interaction between technology mediated HR practices and relationship based work cultures raises rather interesting theoretical and applied questions.

Employee Engagement

Due to the conceptualization, the study aspects and dimensions are detailed in 2.2.1. Employee engagement has become one of the most researchers construct regarding organizational behavior and HRM research (Saks and Gruman, 2014). The conceptualization was given by Kahn (1990) who regarded personal engagement as the harnessing of the selves of organization members to their work role; in engagement, individuals utilize and manifest themselves physically, cognitively and emotionally in their role performances (p. 694). Subsequent theoretical progress has been based on this tripartite conceptualization, which has been physical, cognitive, and emotional engagement.

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In their conceptualization of engagement, Schaufeli et al. (2002) described engagement as a permanent, positive affective-motivational state with three dimensions: vigor (high energy and mental resilience), dedication (strong involvement and sense of significance) and absorption (full concentration and engrossment with work). This is a conceptualization that has received extensive application in empirical studies and has been shown to have strong psychometric quality in various settings.
Saks (2006) identified a difference between job and organization engagement where employees can participate in different ways with their respective occupational position, as opposed to the organization they work with. Both types of engagement apply to the Digital HRM practices since digital systems influence the performance of the tasks and the organizational affiliation.

Prequisites of Employee Engagement.
Numerous antecedents of employee engagement have been identified with a lot of research. Engagement is always predicted by job resources such as autonomy, social support, performance feedback, and skill variety (Bakker and Demerouti, 2017). Fairness perception and organizational support have a role to play in engagement via social exchange mechanisms (Saks, 2006). Transformational leadership is one of the leadership behaviors that promote engagement with its vision, inspiration, and personalized attention (Carasco-Saul et al., 2015).
Much attention has been given to the association between the HR practice and engagement. Different studies have associated increased engagement with high-performance work practices, such as selective staffing, extensive training, performance-based rewards, and participative decision-making (Albrecht et al., 2015). Nonetheless, the possible contribution of Digital HRM practices to the development of engagement has not been studied extensively, especially in the environment of emerging economies.

Employee Engagement and Digital HRM.
The digital HRM practices can affect the employee engagement in several ways. To start with, digital systems improve the speed of communication and information flow, making it less uncertain and increasing the feeling of being informed and connected among employees (Stachova et al., 2024). In the case that employees can easily access information that is in the organization via digital portals and communication platforms, the feeling of belonging and the feeling of psychological safety can be enhanced.
Second, electronic performance feedback systems allow more frequent and specific feedback that is more developmental (Stone et al., 2015). The traditional performance reviews that are made annually usually do not deliver timely feedback that facilitates engagement. Online platforms with a permanent feedback and target tracking can be more helpful to create the conditions of engagement.
Third, online learning platforms portray organizational commitment to employee growth, which is an indicator that employees are treasured and initiates a one-to-one interaction process via social exchange processes (Saks, 2006). Employees who are

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received by organizations with the digital learning opportunity, which is easily accessible and personalized, can reciprocate it by increasing their engagement.

Fourth, the digital recognition systems provide peer-to-peer recognition and timely credits of the contributions. These systems are able to increase the psychological satisfaction of work and enhance the emotional attachment of employees to their organisation.

These theoretical mechanisms are justified by recent empirical studies. In their study, Stachova et al. (2024) discovered that e-HRM tools were found to have a significant prediction of employee engagement within the Slovak organizations. Wang et al. (2024) have shown that digital HRM also affected the competitive attitudes and behaviors of employees that, in turn, had an impact on performance. These relations have however not been properly tested in the Pakistani context.

On the basis of the above theoretical explanation and empirical data we make the following hypothesis:

H1: Digital HRM practices have a significant positive effect on employee engagement**.**

Organizational Performance

Conceptualization and Measurement

Organizational performance is a multidimensional concept that incorporates the extent to which an organization attains its goals and objectives (Richard et al., 2009). Organizational performance has been conceptualized to be more broad based in relation to the performance based on financial measures to operational, stakeholder and strategic measures.

Financial measures of performance are: profitability, ratio of profit on assets, profit on equity and revenue growth (Combs et al., 2005). Operational performance is a concept comprising the productivity, efficiency, quality and innovation performance (Venkatraman and Ramanujam, 1986). Market performance encompasses market share, customer satisfaction and competitive positioning (Kaplan and Norton, 1996).

Organizational performance can be viewed in two different ways in HRM research, objective measures and perceptual measures. Although susceptible to some sort of bias, self-reported performance measures have also proven to be valid and they are commonly applied where objective data is not available or even comparable across organizations (Wall et al., 2004).

HRM and Organization performance.

The association between organizational performance and HRM practices has been theorized and empirically studied a lot. The prevailing theoretical perspective that explains such a relationship is the Resource-Based View (RBV) (Barney, 1991; Wright et al., 2001). RBV postulates that human resource practices have the potential to create long-term competitive advantage where it has generated valuable, rare, imitable and non-substitutable human capital and HR systems.

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The meta-analytic studies confirm that high-performance work practices have a positive relationship with organizational performance (Combs et al., 2006; Jiang et al., 2012). Nevertheless, the black box problem of how HR practices affect performance is still the subject of an ongoing research (Becker and Huselid, 2006). Mediating mechanisms between the HR practices and performance outcomes have proposed the attitudes, behaviors and capabilities of the employees.

Digital HRM and Organizational Performance.

The digital HRM practices have the potential to improve the organisational performance in a variety of ways. There are improvements in operational efficiency, which includes a decrease in administrative expenses, a shorter processing time, and a decrease in errors that are directly linked to performance (Parry and Tyson, 2011). The HR analytics help to improve decision-making based on evidence and make more talent decisions (Marler and Boudreau, 2017). Digital recruitment and development systems provide better talent management that leads to high quality human capital (Stone et al., 2015).

Positive correlations have been reported in the recent empirical studies between digital HRM and performance outcomes. In a cross-industrial sample, Springer (2024) discovered that the digital HR strategy was an important predictor of firm performance. Wang et al. (2024) proved that dynamic capabilities and employee competitive behaviors are the mediating factors in the relations between digital HRM and performance. Nonetheless, there is no specific study done on this relationship in the service sector in Pakistan.

According to theoretical arguments and new empirical data, we suppose the following:

H2: Digital HRM practices have a significant positive effect on organizational performance.

Employee Engagement and Organizational Performance

Theoretical Mechanisms

The connection between employee engagement and the organizational performance is based on several theoretical perspectives. According to the Social Exchange Theory (Blau, 1964) employees have the opportunity to offer rewards and support that leads to engagement hence giving it back to the organization through attitudes and behaviors that are advantageous to the organization such as increased effort, commitment and performance.

According to Job Demands-Resources model (Bakker and Demetriou, 2017), engagement played the role of mediating the correlation between job resources and performance outcomes. Engaged employees work toward mobilizing their personal job resources, open up to new experiences and are more effective in-role and extra-role.

According to the theory of affective events (Weiss and Cropanzano, 1996) emotional experiences in the workplace that are positive in nature, such as those experienced by

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engaged employees, determine work attitudes and behavior at work that add to performance in an organization.

Empirical Evidence

A large amount of empirical studies has shown a positive correlation between the levels of employee engagement and the performance outcomes, both at individual, unit, and organization levels. The meta-analytic results show that engagement is predictive of a task performance and contextual performance as well as customer satisfaction (Christian et al., 2011; Harter et al., 2002). Employees who are engaged are more productive, reduce turnover intent and put in more discretionary effort (Saks, 2006).

At the organizational level, those units, which scored higher on engagement, have better financial performance, customer loyalty, as well as productivity (Harter et al., 2002). The engagement-performance relationship has been established in various industries and in different contexts of nationalities but there is little research in emerging economies. We are theorizing based on sound theoretical grounds and coherent empirical findings:

H3: Employee engagement has a significant positive effect on organizational performance.

The Mediating Role of Employee Engagement

Theoretical Rationale for Mediation

According to the Resource-Based View, the Digital HRM practices are regarded as strategic resources which may create competitive advantage (Barney, 1991). Nevertheless, the performance outcomes are not directly generated by these technological resources; instead, the organizational performance is affected by the impacts of technological resources on the attitudes, behaviors and capabilities of employees (Wright et al., 2001). One of the main psychological processes in which Digital HRM is transformed into better results is employee engagement.

This mediating pathway is further supported through the Social Exchange Theory. The practice of digital HRM such as open communication, growth and rewarding platforms, show the organizational investment in employees. Such investments provoke the sense of obligation and reciprocity as per the principles of social exchange which are expressed in terms of increased engagement (Saks, 2006). Engaged employees on the other hand can help company performance by giving improved efforts, commitment and citizenship behavior.

It is argued based on the Technology Acceptance Model (Davis, 1989) that the perceived usefulness and ease of use of digital HR systems is the determinant of the acceptance and use of information systems by employees. In a scenario where the digital systems are so well-designed and well-implemented, then employees will feel that these systems are useful and easy to operate with, and hence they will have good

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attitudes towards both the technology and the organization. These attitudes are positive and that leads to engagement which in turn affects performance.

Mediation Empirical Evidence.

Research on the role of mediation in HRM-performance relationship has been found to include the employee attitudes such as employee engagement as mediators. Messersmith et al. (2011) discovered that the relationship between high-performance work practices and the organizational citizenship behaviors was mediated by the attitude of the employees. Kehoe and Wright (2013) indicated that the perceptions of employees towards the HR practices had an effect on engagement and commitment which then projected results.

Wang et al. (2024) discovered that employee competitive attitudes and behaviors acted as a partial mediator between digital HRM-performance relationship in the digital HRM setting. Nevertheless, there are limited studies on the direct analysis of employee engagement as a mediator of Digital HRM-performance relationship, especially in emerging economies. On the basis of theoretical reasoning and new empirical evidence, we make the following hypothesis:

H4: Employee engagement mediates the relationship between Digital HRM practices and organizational performance.

The Moderating Role of Digital Competence

Conceptualizing Digital Competence

Digital competence describes how an individual uses digital technologies for work, learning and engaging with the society effectively and critically (Ferrari, 2012). It is not only a set of basic technical skills but more advanced skills such as information literacy, collaboration and communication, creating digital content, safety and problem-solving in digital environments (van Laar et al., 2020).

Digital competence is an alternative of ordinary digital literacy in that it focuses on confident, critical and creative use of digital technologies. Skilled users of digital devices not only use the digital devices to perform tasks but also analyze information, adjust to the changing technology, and resolve issues with the help of the digital devices (Ilomaki et al., 2016).

Theoretical Rationale of Moderation

The evolution of Digital HRM effects as mediated by human capital is grounded on Human Capital Theory (Becker, 1964) as the premise explaining the rationale of the possibility of Digital Competence. The knowledge, skills and abilities that are represented in people make up human capital, and it is human capital that determines the productivity of the employees and organizational systems. The higher the digital competence of the employees, the higher the likelihood of utilizing digital HR

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systems to their advantage, and derive more value out of the technological investments.

Technology Acceptance Model proposes that ease of use impacts on the adoption and usage of technology (Davis, 1989). Digitally more competent employees will find digital HR systems less challenging to use, thus, becoming more readily accepted, utilized more and have more positive attitudes toward the technology and the organization. These favorable reactions ought to be converted into more powerful engagement impacts.

Also, there is social cognitive theory (Bandura, 1986) which implies that self-efficacy has an effect on the way people relate with their environment. More digitally competent employees have a higher level of digital self-efficacy-belief in their capacity to succeed in utilizing digital technologies. This trust allows them to have a positive attitude to digital HR systems, continue to learn the functionality of the system, and find more meaning in digital communication.

Moderation as an Empirical Evidence.

The evidence on the use of digital competence as a mediator in the organization is growing, but not fully developed. Researchers have investigated the impact of digital skills on the success of technology based learning (van Laar et al., 2020) and the use of digital work tools (Vuorikari et al., 2016). Airlangga et al. (2025) discovered that digital competence had an impact on the benefits of digital transformation programs among the labor force.

Nevertheless, there is no direct study of the issues of digital competence as the mediator of the Digital HRM-engagement relationship. This is especially relevant in developing economy settings in which there might be a wide range in the level of digital competence throughout the workforce to the extent that there is unequal access to technology and digital education. It is on the basis of theoretical arguments and empirical evidence that we hypothesize:

H5: Digital competence moderates the relationship between Digital HRM practices and employee engagement, such that the positive effect of Digital HRM on engagement is stronger for employees with higher digital competence.

Theoretical Framework

Figure 1 shows the conceptual framework that will be used in this study. The framework incorporates the hypothetical connections between Digital HRM practices (independent variable), employee engagement (mediator), organizational performance (dependent variable) and digital competence (moderator).

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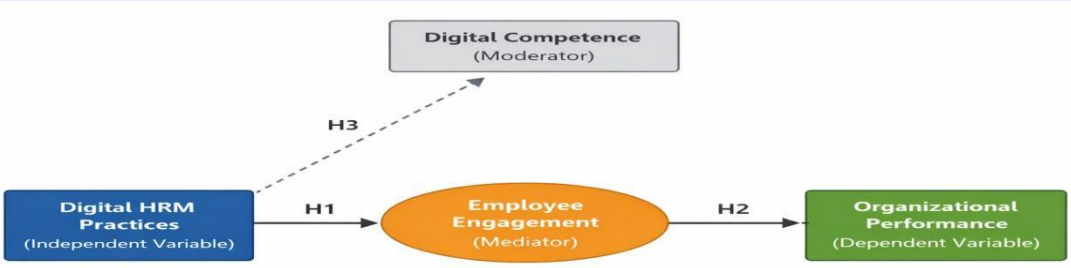

Summary of Hypotheses

Table 1: Summary of Research Hypotheses

Hypothesis	Statement
H1	Digital HRM practices have a significant positive effect on employee engagement
H2	Digital HRM practices have a significant positive effect on organizational performance
H3	Employee engagement has a significant positive effect on organizational performance
H4	Employee engagement mediates the relationship between Digital HRM practices and organizational performance
H5	Digital competence moderates the relationship between Digital HRM practices and employee engagement, such that the positive effect is stronger for employees with higher digital competence

METHODOLOGY

Research Philosophy and Approach

In this paper, the positivist research philosophy was used, and it presupposes that the social reality is objective and is measurable with the help of empirical observation (Saunders et al., 2019). Positivist approach is suitable due to the functions of the study to test theoretically based hypotheses and to analyze causal relationship among clearly

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developed constructs. Quantitative research approach was used, which allowed means of testing relationships statistically and generalizing the results on the larger population.

Research Design

This study was carried out using a cross-sectional survey design. The researchers measured data at one specific time of the employees in digitally transformed organizations in the Pakistan service sector. Cross-sectional designs cannot be used to study cause-and-effect relationships; nevertheless, they are suitable in studying relationships that have been theoretically anticipated and are common in organizational studies (Spector, 2019). The design facilitated the ability to conduct effective data collection using a large sample and at the same time make it possible when resources are limited.

Population and Sampling

Target Population

The sample size was the employees who were in digitalized organizations in the service industry in Pakistan. The selection of three particular industries was informed by the fact that they have proven to be adopters of digital HR practices, especially the banking, telecommunication and information technology sectors. These sectors are the pioneers of digital transformation in Pakistan and are fitting backgrounds to study the effects of Digital HRM.

Banking Sector: Pakistani banks, both government and privately owned, have invested a lot on digital HR systems. Digital transformation has been highly encouraged by the State Bank of Pakistan leading to the high use of HR information systems, digital recruitment websites and e-learning portals among the banking sector.

Telecommunications Sector: The telecommunications firms in Pakistan are in a very competitive industry and have integrated digital technologies in their businesses. Huge contenders such as Jazz, Telenor Pakistan, Zong and Ufone have adopted all round digital HR systems.

Information Technology Sector: IT companies in Pakistan, whether small software houses or big multinational outsourcing companies are digital in nature. Such organizations also implement digital technologies naturally, covering all the spheres of operations, including the Hr functions.

Sampling Frame

The sample frame was composed of the employees working in the organizations that were included in the respective industry associations: Pakistan Banks Association, Pakistan Telecommunication Authority licensed operators, and member companies of Pakistan Software Export Board. The sampling method used was a multi-stage sampling method in order to be representative**.**

Sampling Technique

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Participants were selected by stratified random sampling. The stratification was done based on two dimensions: industry (banking, telecom, IT) and organization size (large, medium). In every stratum, organizations were sampled randomly and in sampled organizations, workers were invited to take part randomly. This design was used to have representation in industries and types of organizations and randomization.

Sample Size Determination

The choice of sample size was according to Structural Equation Modeling recommendations. In line with Hair et al. (2019), a ratio of 10 respondents per indicator variable was aimed at. The measurement scales had 24 indicator variables and therefore 240 was the minimum sample needed. A target population of 500 was set to consider any possible non-response and unfinished data. The obtained final sample of 450 valid responses was more than the minimum and had sufficient statistical power to perform the intended analyses.

Data Collection Procedure

Instrument Development

A structured questionnaire was developed based on established, validated scales from prior research. The questionnaire comprised five sections:

Section A: Demographic information (age, gender, education, organizational tenure, industry)

Section B: Digital HRM practices scale

Section C: Employee engagement scale

Section D: Digital competence scale

Section E: Organizational performance scale

All scale items were measured using a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was developed in English, which is the primary business language in Pakistani organizations and the medium of instruction in higher education.

Pilot Testing

To determine the level of clarity, understanding, and time taken to complete the questionnaire, the questionnaire was piloted on 30 workers in the target industries. According to the pilot responses, some slight modification of wording was done to improve the understanding. The final analysis did not involve pilot data.

Data Collection

Data were taken within the period of January 2025 to March 2025. In order to reach the maximum response rate, questionnaires have been spread in several ways: (1) email invitations containing links to online surveys, (2) paper questionnaires distributed via organizational acquaintances, and (3) QR code links are provided via professional networks. The involvement was voluntary, and anonymity was ensured to get truthful responses. Reminders were followed two weeks after. The questionnaires were distributed to 750 people and 487 of these people responded (487

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out of 750 people or 64.9%). Following the screening of the incomplete and patterned answering, 450 valid questionnaires were analyzed (effective response rate = 60.0%).

Measures

Digital HRM Practices

A scale was adapted and based on the works of Airlangga et al. (2025) and Stachova et al. (2024) to measure the digital HRM practices. The scale included 8 items that addressed four aspects of Digital HRM, namely, digital recruitment (2 items), digital learning and development (2 items), digital performance management (2 items), and HR information systems (2 items). The sample items are: My organization needs digital platforms to recruit and select employees and provide performance feedbacks with the help of the digital system.

Employee Engagement

The scale created by Saks (2006) was used to measure employee engagement by making a distinction between job engagement and organization engagement. This scale included 6 items (3 job engagement, and 3 organization engagement). The sample items are: "I do engage myself seriously into my job" and "I found it very interesting to be a member of this organization.

Digital Competence

A modified version of the Digital Competence framework scale created by van Laar et al. (2020) was used to measure digital competence. The scale had 6 questions that address core dimensions of digital competence such as technical skills, processing information in digital context, communication and solving problems in the digital environments. Examples of such items are: I am sure enough when it comes to using digital tools to do work-related work and I can adequately assess the information that was presented via the use of digital sources.

Organizational performance

A perceptual scale based on the previous HRM studies was used to determine organizational performance (Delaney and Huselid, 1996; Wang et al., 2024). The scale had 4 questions evaluating the perceived performance of organization against other organizations on such dimensions as productivity, profitability, quality of the services and employee productivity. The sample items will comprise: "My organization is more productive in employees compared to its competitors and My organization is doing well regarding service quality.

Control Variables

A number of demographic factors were also used as controls to control the possible confounding factors age (years), gender (0 = male, 1 = female), education (bachelor, master, higher), organizational tenure (years), and industry (dummy with banking taken as the reference category).

Common Method Variance

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Since self-report questionnaires were used to collect all the data at one time, common method variance (CMV) was a potential threat. A number of procedural remedies were introduced in accordance to Podsakoff et al. (2012):

Assurance of anonymity: The participants could be confident of anonymity to minimize the social desirability bias.
Counterbalancing: **S**cale items were introduced randomly to lower the priming effects.
Differences in range: the various parts were using different anchors and formats.
Psychological partition: A cover story was put in focus that the various sections dealt with different subjects.

The testing of CMV was done statistically by using the single-factor test of Harman. Everything was subjected to exploratory factor analysis where the solution is not rotated. The initial factor explained the variance of 28.7 which was less than the half mark implying that CMV was not a significant issue.

Data Analysis Strategy
The analysis of the data was carried out in a few steps in the SPSS version 26 and AMOS version 26:

Stage 1: Preliminary Analysis - The screening of data with missing values, outliers, and normal distribution. Correlations and descriptive statistics were calculated.

Stage 2: Measurement Model Assessment- Confirmatory Factor Analysis (CFA): This phase involved confirmation of psychometric properties of the measurement scales reliability, convergent validity and discriminant validity.

Stage 3: Structural Model Assessment - Structural model was tested to test the hypothesized relationships. Various indices were used to evaluate model fit: Chi-square/df ratio, Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) and Root Mean Square Error of Approximation (RMSEA).

Stage 4: Mediation Analysis - Bootstrapping procedures with 5,000 resamples were used to test the mediating effect of employee engagement to obtain bias-corrected confidence intervals of indirect effects.

Stage 5: Moderation Analysis - Latent moderated structural equations (LMS) test in AMOS were used to test the moderating effect of digital competence. Terms of interaction were developed and added to the mode.l.

Ethical Considerations
The research followed some of the ethical principles of research involving humans in this study. Data collection was done with ethical approval of the institutional review

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board. The involved subjects were made aware of the objective of the research, the voluntary nature of the involvement and the right to withdraw without any blame. All participants were informed about the study. To ensure the confidentiality of the data, they were anonymized and stored safely.

RESULTS

Sample Characteristics

Table 2 shows the demographic data of the sample. The sample of 450 participants was a final sample that represented a variety of demographic and organizational backgrounds.

Table 2: Sample Demographics (N = 450)

Characteristic	Category	Frequency	Percentage
Gender	Male	312	69.3%
	Female	138	30.7%
Age	20-30 years	189	42.0%
	31-40 years	176	39.1%
	41-50 years	67	14.9%
	Above 50 years	18	4.0%
Education	Bachelor's degree	203	45.1%
	Master's degree	212	47.1%
	Higher/Professional	35	7.8%
Industry	Banking	184	40.9%
	Telecommunications	142	31.6%

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Characteristic	Category	Frequency	Percentage
	Information Technology	124	27.5%
Organizational Tenure	Less than 1 year	67	14.9%
	1-3 years	158	35.1%
	4-7 years	136	30.2%
	More than 7 years	89	19.8%

The sample was also mainly male (69.3%), as it is the reality of the formal service sector in Pakistan. Sixty-eight-one point one percent of the participants (81.1) fell within the range of 20-40 years, which is also a representative of the young workforce in Pakistan. The education level was good with 94.2% having at least a bachelors degree. The representation of the industry was quite evenly balanced with the banking (40.9%), telecommunications (31.6%), and IT (27.5%). The distribution of organizational tenure showed a combination of new and experienced employees..

Descriptive Statistics and Correlations

Table 3 presents the means, standard deviations, and correlations among the study variables.

Table 3: Descriptive Statistics and Correlations

Variable	Mean	SD	1	2	3	4	5	6
1. Digital HRM	3.87	0.72	0.84					
2. Employee Engagement	3.92	0.68	0.48**	0.86				
3. Digital	3.79	0.75	0.41	0.44*	0.88			

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Variable	Mean	SD	1	2	3	4	5	6
Competence			**	*				
4. Organizational Performance	3.84	0.71	0.45**	0.52**	0.39**	0.85		
5. Age	32.45	7.82	0.08	0.11*	0.04	0.09	—	
6. Gender	0.31	0.46	-0.03	0.02	-0.05	-0.01	-0.04	-
7. Tenure	4.23	3.67	0.10*	0.12*	0.06	0.08	0.62**	-0.2

*Note: N = 450. Diagonal values in bold represent square root of AVE. **p < .01, *p < .05. Gender coded 0 = male, 1 = female.*

The mean scores of the constructs were above the scale midpoint (3.0), which means that the Digital HRM practices (M = 3.87), employee engagement (M = 3.92), and digital competence (M = 3.79) and the overall performance of the organization (M = 3.84) are generally positive. Standard deviations were between 0.68 and 0.75 which implies a sufficient variability.

Correlation analysis showed that all the substantive variables have significant positive relationships. Digital HRM was positively associated with employee engagement (r = 0.48, p <.01), digital competence (r = 0.41, p <.01) as well as organizational performance (r = 0.45, p <.01). There was a positive relationship between employee engagement and organizational performance (r = 0.52, p < .01). These associations do give initial evidence to the hypothetical associations. Control variables did not have significant correlations with substantive variables therefore there were not many confounding variables..

Measurement Model Assessment
Confirmatory Factor Analysis

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Confirmatory Factor Analysis (CFA) was done to determine the psychometric properties of the measurement scales. The proposed four-factor model (Digital HRM, Employee Engagement, Digital Competence, Organizational Performance) was put in opposition to other models.

Table 4: Model Fit Indices for Measurement Models

Model	χ^2	df	χ^2/ df	CFI	TLI	RMSEA	SRMR
Four-factor model (hypothesized)	432.18	246	1.76	0.95	0.94	0.041	0.045
Three-factor model (combining DHRM & DC)	687.45	249	2.76	0.88	0.87	0.063	0.062
Two-factor model (combining all predictors)	892.34	251	3.56	0.82	0.80	0.076	0.071
Single-factor model	1243.67	252	4.94	0.71	0.68	0.094	0.089

Note: DHRM = Digital HRM, DC = Digital Competence, EE = Employee Engagement, OP = Organizational Performance.

The four-factor model was hypothetically proposed, and the model was fitted in an excellent manner (kh2/df = 1.76, CFI = 0.95, TLI = 0.94, RMSEA = 0.041, SRMR = 0.045). Fit indices were found to be more than suggested (Hair et al., 2019): kh2/df < 3, CFI>0.90, TLI>0.90, RMSEA<.06, SRMR<.08. The model with four factors had a significant better fit than any other model, as shown by the chi-square differences

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tests (p <.001 in all comparisons) and this supports the distinctiveness of the study constructs.

Reliability and Validity

Table 5 presents reliability and validity statistics for the measurement scales.

Table 5: Reliability and Validity Assessment

Construct	Items	α	CR	AVE	MSV
Digital HRM	8	0.89	0.91	0.71	0.28
Employee Engagement	6	0.87	0.89	0.74	0.33
Digital Competence	6	0.91	0.93	0.77	0.25
Organizational Performance	4	0.86	0.88	0.72	0.33

Note: α = Cronbach's alpha, CR = Composite Reliability, AVE = Average Variance Extracted, MSV = Maximum Shared Variance.

There was a Cronbach alpha coefficient of between 0.86 and 0.91 which is more than the recommended alpha of 0.70 (Nunnally and Bernstein, 1994) and this implies great internal consistency reliability. The composite reliability scores were between 0.88 and 0.93, which is above the level of 0.70, and again indicates reliability.

Average Variance Extraction (AVE) was used to measure convergent validity. The values of all AVE were greater than the recommended minimum of 0.50 (Fornell and Larcker, 1981) (0.71- 0.77) which shows that each construct had more than 50 per cent of the variance of its indicators.

The square root of AVE (Table 3 diagonal values) was compared with inter-construct correlations in order to establish discriminant validity. The square root of AVE of each construct was greater than the correlation of the construct with others, which fulfills the Fornell-Larcker criterion. Furthermore, all of the AVE values were above Maximum Shared Variance (MSV) and this also supports the idea of discriminant validity.

Structural Model Assessment

Model Fit

All the hypothesized paths were tested in the structural model. The kh2/df = 1.89, CFI = 0.94, TLI = 0.93, RMSEA = 0.044, SRMR = 0.048 was quite good and fits the data.

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All the fit indices were reasonable and, therefore, it was shown that the hypothesized structural model was sufficient to model the data..

Hypotheses Testing (Direct Effects)
Table 6 presents the results of hypotheses testing for direct effects.

Table 6: Direct Effects Hypotheses Testing

Hypothesis	Path	β	SE	t-value	p-value	Result
H1	Digital HRM → Employee Engagement	0.42	0.05	8.40	<.001	Supported
H2	Digital HRM → Organizational Performance	0.37	0.05	7.40	<.001	Supported
H3	Employee Engagement → Organizational Performance	0.45	0.05	9.00	<.001	Supported

Note: β = standardized regression coefficient, SE = standard error.

H1 was that the practices of Digital HRM would have a positive impact that is significant and positive on employee engagement. This hypothesis was proved by the results (b = 0.42, p <.001), the authors stated that workers who feel that the Digital HRM practices are more comprehensive and effective report greater employee engagement.

The H2 was that Digital HRM practices would affect the organizational performance significantly in a positive manner. This hypothesis was confirmed by the findings (b = 0.37, p <.001) meaning that the practice of Digital HRM is positively related to the perceived organizational performance.

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H3 assumed that employee engagement would positively impact on organization performance significantly. This hypothesis was confirmed by the results (b = 0.45, p <.001) which means that engaged employees lead to an improvement of the organizational performance.

Mediation Analysis (H4)

Mediation was tested using bootstrapping procedures with 5,000 resamples to generate bias-corrected confidence intervals for indirect effects. Table 7 presents the mediation results.

Table 7: Mediation Analysis Results

Path	Direct Effect (c')	Indirect Effect (ab)	Total Effect (c)	Boot SE	95% CI	Result
DHRM → EE → OP	0.21**	0.16**	0.37**	0.03	[0.11, 0.22]	Partial Mediation

Note: DHRM = Digital HRM, EE = Employee Engagement, OP = Organizational Performance. **p < .01. CI = Bias-corrected confidence interval (lower, upper).

H4 was that there would be a mediation between Digital HRM and the organizational performance by the employee engagement. These findings were in favor of this hypothesis. Digital HRM had an indirect positive impact on the performance of the organization due to employee engagement (b = 0.16, p <.01, 95% CI [0.11,0.22]). The strength of the effect after the inclusion of the mediator was still significant (b = 0.21, p < .01), which showed that it was partially mediated. The mediated effect explained about 43 per cent of the full effect.

Moderation Analysis (H5)

Latent moderated structural equations (LMS) was used to test moderation. There was an interaction term (Digital HRM × Digital Competence) that was formed and incorporated into the model that predicted employee engagement. The results of moderation are shown in table 8.

Table 8: Moderation Analysis Results

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Predictor	β	SE	t-value	p-value
Digital HRM	0.38	0.05	7.60	<.001
Digital Competence	0.31	0.05	6.20	<.001
Digital HRM × Digital Competence	0.18	0.04	4.50	<.001

Dependent Variable: Employee Engagement. $R^2 = 0.34$ for main effects; $\Delta R^2 = 0.03$ for interaction ($p < .01$).

H5 stated that the relationship between Digital HRM and employee engagement would be mediated by digital competence such that the positive relationship would be more pronounced among the employees who are better in digital competence. These findings were in favor of this hypothesis. It was found that the interaction term was significant (0.18, p <.001), and the addition of the interaction term resulted in significant extra variance (0.03, p <.01).

Simple slope analysis was done at high (+1 SD) and at low (-1 SD) values of digital competence to interpret the moderation effect.

The simple slope analysis indicated that the positive impact of Digital HRM on employee engagement was greater with high levels of digital competence (simple slope = 0.48, p <.001) than with low levels of digital competence (simple slope = 0.28, p <.001). This finding is in line with the hypothesized moderation: the more digitally competent employees, the more they get the benefits of engagement due to Digital HRM practices.

Summary of Hypotheses Testing

Table 9 summarizes the results of all hypotheses testing.

Table 9: Summary of Hypotheses Testing Results

Hypothesis	Statement	Result
H1	Digital HRM → Employee Engagement	Supported
H2	Digital HRM → Organizational Performance	Supported
H3	Employee Engagement → Organizational Performance	Supported

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Hypothesis	Statement	Result
H4	Employee Engagement mediates DHRM-OP relationship	Supported mediation)
H5	Digital Competence moderates DHRM-EE relationship	Supported

DISCUSSION

Overview of Findings

This paper has explored the correlation between Digital HRM practices, employee engagement, organizational performance and digital competency in the service industry in Pakistan. The results are very supportive to the model of the hypothesis. Digital HRM practices showed a great positive impact on employee engagement and organizational performance. The engagement of employees was an important intermediary of the Digital HRM-performance association, which partially describes the way digital HR investments can be transformed into organizational performance. Digital competence mediated the Digital HRM-engagement relationship which means that the gains of digital HR systems are related, in part, to the ability of the employees to use digital instruments efficiently.

Digital HRM and Employee Engagement

The observation that the practices of Digital HRM are a strong predictor of employee engagement (H1 supported) supports and builds on previous studies. The same author Stachova et al. (2024) discovered that e-HRM tools increased engagement in the Slovak organizations. The processes involved in this relationship in the Pakistani setting are worth discussing.

Engagement can be promoted by digital HRM practices, which can lead to improved communication and transparency. In Pakistan, which is a collectivist society where relationships and social connectedness are paramount (Hofstede, 2001), online communication and connection platforms can prove especially effective. Digital systems provide employees with access to organizational information, ability to communicate with their colleagues, and access to timely feedback which can result in a higher level of psychological safety and organizational attachment.

Moreover, web-based learning and development systems are indicators of organizational commitment to employees. With informal education and skill building being a significant concern in the environment, online resources that offer easy access to learning can work in a way that indicates a commitment of an organization, where social exchange processes can be activated to trigger a two-way interaction (Saks, 2006).

The Technology Acceptance Model is also predicted by the great connection between Digital HRM and engagement (Davis, 1989). Employees who find digital HR systems

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helpful and user-friendly feel positive about the technology and the organization, which leads to the improvement of engagement.

Digital HRM and Organizational Performance

The positive direct effect of Digital HRM on organizational performance (H2 supported) proves that investments in digital HR have a positive impact on the performance. The finding is similar to other recent studies by Wang et al. (2024) and Springer (2024), which generalize them to the Pakistani environment.

This relationship might be attributed to a number of mechanisms. The benefits of operational efficiency (reduced processing time and administrative costs and few errors) directly translate into performance (Parry and Tyson, 2011). With HR analytics, it becomes easier to make improved evidence-based talent decisions that boost the quality and deployment of human capital (Marler & Boudreau, 2017). Enhanced talent management by means of digital recruitment and development systems will make sure that organizations can attract, develop, and retain employees of better quality (Stone et al., 2015).

These performance benefits might be especially helpful in the Pakistani environment, where organizations are becoming more and more competitive and connected to world markets. Pakistani companies can become more competitive through digital HR systems because they help to improve efficiency and quality of human capital.

Employee Engagement and Organizational Performance

The positive correlation that was found to be significant between the engagement among employees with organizational performance (H3 supported) is supported by the long history of previous studies (Christian et al., 2011; Harter et al., 2002). This result confirms the pivotal role of employee engagement as a factor of organizational success, which applies to the Pakistani service sector.

The processes that relate engagement to performance are increased effort, persistence and discretionary behavior. Employees who are engaged put more effort in their job roles, they continue their activities despite the difficulties and they also participate in citizenship activities, which help the organization (Saks, 2006). At the aggregate level, these contributions at the individual level are translated into the improved unit and organizational performance.

Engaged employees could be especially inspired to make contributions towards the organizational success in the Pakistani cultural background where group harmony and contribution are valued by collectivism values (Hofstede, 2001). The social aspect of interaction, a sense of belonging to and commitment into the organization, could be very close to collectivist values.

Mediating Role of Employee Engagement

The large mediating role of employee engagement (H4 supported) can be viewed as valuable information on how Digital HRM can affect performance. This result models the black box in the research on HRM (Becker and Huselid, 2006), proving that

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psychological conditions, namely engagement, is one of the primary streams of influence between the HR investment in technology and the organizational performance.

This result of mediation proves the focus of the Resource-Based View regarding human capital as a competitive advantage source (Barney, 1991). As a strategic resource, digital HRM systems impact performance because of the way they affect employee attitudes and behaviors. The result also confirms the Social Exchange Theory expectations that organizational investments (in digital HR systems) will cause employee behavioral returns (engagement), which will in turn have organizational returns (Saks, 2006).

The partial mediation (43% of total effect mediated) shows that engagement is a key process but there are other channels that bring about the Digital HRM-performance relationship. These might encompass operational efficiency increases, better decision making, and better talent management results which are independent of the effect of engagements..

Moderating Role of Digital Competence

The moderating role of digital competence (H5 supported) is also a valuable addition to the knowledge about boundary conditions of Digital HRM effectiveness. That the employees with greater digital competence are found to be affected more favorably by Digital HRM in their engagement is consistent with Human Capital Theory (Becker, 1964) and would have significant practical implications.

More digital competent employees are the ones who are skilled and confident to use digital HR systems. They will be able to use digital platforms effectively and retrieve needed information and implement digital technologies in the workplace. This will allow them to gain more out of digital investments in HR, as they will have an increased level of communication, feedback, and developing opportunities that will engage them.

On the other hand, low digital competence employees might not be able to cope with the digital HR systems, feeling frustrated, ineffective, and getting less benefits. To such employees, digital systems can be enablers, which are barriers and not facilitators, which may reduce and not increase engagement.

The moderation result is especially important in the Pakistani setting where the level of digital competence can have a considerable difference based on differences in access to technology and access to digital education. Companies adopting digital HRs should take these differences into consideration and offer the relevant training and assistance to make all employees reap the advantages of digital HR investments.

Integration with Theoretical Frameworks

All the findings are in line with the combined theoretical framework that will lead to this research. This is confirmed by the Resource-Based View finding that practices of Digital HRM (strategic resources) do affect performance outcomes, to some extent, via their impact on employee engagement (human capital). The moderating effect of digital competence supports Human Capital Theory because it shows that the skills of

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employees can increase the utility of investments in technologies. The implication of the Technology Acceptance Model is that employees who can effectively make use of digital systems affect their reactions towards those systems..

IMPLICATIONS

Theoretical Implications

This research has various theoretical contributions in the Digital HRM and organization behavior literature.

The first is that it expands the research on Digital HRM to a less-researched emerging economy setting. The majority of studies on Digital HRM are based on the developed Western economies, and not much focus is directed to South Asia. By showing that the Digital HRM effects are also applicable to the service sector in Pakistan, the research helps to support the cross-cultural relevance of Digital HRM theories, as well as to find some context-specific factors to consider (e.g., the impact of the collectivist values on the engagement processes).

Second, the research is relevant to the study of mechanisms between Digital HRM and performance. Identifying employee engagement as an influential mediator makes it a light that sheds light on psychological mechanisms that transform technological investments in HR to organizational performance. Such a finding solves the black box problem and contributes to theoretical knowledge on the role of the HR systems in performance (Becker and Huselid, 2006).

Third, the designation of digital competence as a moderator progresses the knowledge on the condition of boundaries in Digital HRM effectiveness. Whereas the existing literature has focused on the main effects of Digital HRM, minimal focus on situations in which the effects are enhanced or diminished has been taken. The observation that digital competence improves the Digital HRM-based gains combines the Human Capital Theory with the Digital HRM study, indicating that technological and human capital investments are complementary as opposed to independent.

Fourth, the research will help the field of engagement theory to gain an insight into the Digital HRM practices as antecedents of engagement. Although much has been done concerning job resources, organisational support, and leadership as engagement antecedents (Bakker and Demerouti, 2017), there has been less emphasis on the role of digital systems in engagement. According to this paper, digital HR practices constitute a set of organizational resources that help to stimulate engagement.

Fifth, the research adds to the Technology Acceptance Model by showing that the concept of digital competence determines the way in which employees may respond to organizational technologies. Although TAM focuses on perceived usefulness and ease of use (Davis, 1989), this study indicates that actual competence is also related, which pushes the knowledge of technology acceptance processes.

Practical Implications

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Implications for Employees

In the case of workers in Pakistan service sector, this research paper highlights the need to achieve digital competence. Organizational digital HR initiatives will benefit more employees who invest in improving their digital skills and will find it more engaging, as well as through contributing to the organizational success. Active exploration of digital learning opportunities or exploration inside and outside the organization is a useful career investment..

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Methodological Limitations

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Cross-Sectional Design: This study is limited to cross-sectional design implying it cannot be causal. Although the hypothesized relationships are based on theory and aligned with the previous longitudinal studies, the given design does not enable conclusiveness in regard to causality. The use of longitudinal designs with several measurement waves in the future would offer more credible results about causation of associations.

Common Method Variance: Despite the introduction of procedural remedies and the implication that CMV was not a concern of high-priority, the adoption of single-source self-report data brings about the risk of common method bias. This limitation may be overcome by including multi-source data in future research, e.g. supervisor ratings of performance or objective performance indicators.

Self-Reported performance: Organizational performance was estimated using the perception of employees and not actual financial or operational performance. Although perceptual measures have proved to be valid (Wall et al., 2004) and hence suitable in situations where the objective data is not available, in future studies, an effort should be made to incorporate objective performance measures wherever feasible.

Single Country Context: The emphasis on Pakistan, though useful in filling the research gap in the emerging economies, restricts generalization of other countries. The model ought to be studied by future researches in other emerging economies and compare nations to evaluate the contextual boundary conditions.

Measurement Limitations

Digital HRM Conceptualization: Digital HRM was a unidimensional measure that combined functions of HR. The question that could be addressed in future studies is on the different digital HR functions (recruitment, training, performance management) to find out whether they have a difference or not on the engagement and performance.

Engagement Conceptualization: The employee engagement was assessed on a global scale. Further studies may focus on exploring the hypothesis of whether Digital HRM has a different impact on job engagement and organization engagement, and the differences between the two are relevant to performance outcomes.

Digital Competence Measurement: Digital competence was self-reported and it is not necessarily objective competence. The objective measurements of digital skills or supervisor ratings of digital competence could be included in future research.

Theoretical Limitations

Missing Variables: The model concentrated on the engagement as the main mediator and digital competence as the main moderator. Other possible mediators (e.g. organizational commitment, job satisfaction, trust) and moderate (e.g. organizational culture, leadership style, industry characteristics) were not considered. Subsequently, the study may include more variables in future studies in order to come up with a more detailed picture.

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Level of Analysis: The research was conducted at an individual level. Nevertheless, the Digital HRM impacts can be on various levels (personal, group, company). Future studies which utilize multilevel modeling would be able to investigate cross-level effects and processes.

Cultural Context: The context was the Pakistani context though the various cultural dimensions were not directly measured. Follow-up studies would use cultural values (e.g., collectivism, power distance) as moderators in order to test the conditions of cultural boundaries directly.

Future Research Directions

Relying on these restrictions and the outcomes of the study, some of the possible future research directions are suggested:

Longitudinal and Experimental Designs: Future studies must adopt longitudinal designs to monitor the implementation of Digital HRM across time so as to be able to make stronger causal inferences and investigate the dynamics over time. It can also be useful to compare organizations that are at various levels of digital transformation in a quasi-experimental design.

Multi-Level Studies: A study with multiple levels (individual, team, organization) of Digital HRM finding employing suitable analytic tools would contribute to the comprehension of the relationships between levels and emergent outcomes.

Objective Performance Metrics: It would help to integrate objective data on performance financial performance, productivity measurements, and even quality indicators, which would serve to increase confidence in the results and allow the researcher to test the hypothesis about the convergence of perceptual and objective measures.

Cross-Nation Cross-Studies: Comparative research on digital HRM effects in countries that have varying cultures, economies, and institutional frameworks would shed light on the boundary conditions and positively contribute to the development of theories.

Qualitative Investigations: Supplementary qualitative studies of the lived experience of employees using digital HR systems may generate valuable information on the mechanisms of actions underlying the quantitative data and reveal the unexpected consequences.

Analysis of Negative Effects: This paper concentrated on positive outcomes, yet there can be negative outcomes of the use of digital HR systems (e.g., technostress, privacy, poor human interaction). The research on the negative aspects of it should be conducted in the future to present us with the balanced picture.

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Intervention Research: Research on particular digital HR interventions (e.g., adoption of a new performance management system) with pre- and post-measures might give practitioners useful information and examine the cause-effect relationships.

Generational Differences: Since the workforce of Pakistan is young, it would be worthwhile to conduct a research on whether the effects of Digital HRM are different between the generations (digital natives and digital immigrants).

CONCLUSION

This paper examined the existence of relationships between Digital Human Resource Management practices, employee engagement, organizational performance and digital competence within the service industry in Pakistan. The results show that the Digital HRM practices have a considerable positive impact on the employee engagement and performance within a company. Employee engagement modulates the Digital HRM-performance relationship partially, which shows a significant psychological mechanism according to which digital HR investments become organizational results. Digital skills mediate the Digital HRM-engagement relationship, meaning that people having higher digital skills will benefit more in engagement because of digital HR systems.

These results have a number of contributions. In theory, they apply Digital HRM research to an emerging economy setting, clarify mediating processes, delimit boundary conditions and combine various theoretical approaches. In practice, they can offer evidence-based suggestions to HR managers and organizational leaders who are investing in digital HR systems, which accentuate the role of employee experience, integrated implementation, focused support, and development of digital skills.

With organizations in Pakistan and other similar emerging economies still on the digital transformation pathways, it is all the more important to know the circumstances in which the digital HR investments can produce optimal returns. This research recommends that successful digital HR implementation should focus not only on technology but also on people who have to be addressed in terms of their engagement, their proficiency and experience with digital systems. Any organization that not only supports the technological aspects of digital transformation but also addresses the human aspects of the same will be in a good position to achieve the performance benefits that Digital HRM promises.

Digitalization of HR does not only mean the introduction of new technologies, but using those technologies to create employment environments within which employees can flourish and achieve their best. Digital systems contribute to the engagement that drives an organization to success when they improve communication, facilitate development, offer recognition, and improve performance. The benefits are multiplied, when employees have the digital competence to make use of such systems to the full extent. This combined approach technology and people at work together is the future of HR in the digital era.

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