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Digital Banking Innovation and Human Resource Agility: Examining Organizational Resilience in the Financial Sector

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ABSTRACT

This study examines the relationship between digital banking innovation, human resource agility, and organizational resilience in Pakistan's banking sector, with particular emphasis on the mediating role of human resource agility. A quantitative, cross-sectional research design was adopted, and data were intended to be collected through a self-administered structured questionnaire from 305 employees of selected commercial banks, including Habib Bank Limited, United Bank Limited, National Bank of Pakistan, Muslim Commercial Bank, Allied Bank Limited, Bank of Punjab, Bank of Khyber, and Bank AL Habib Limited. Convenience sampling was specified, and the data analysis plan included descriptive statistics, reliability analysis, Pearson correlation, multiple regression, and mediation analysis using Hayes' PROCESS Model 4 with 5,000 bootstrap samples. The illustrative statistical results indicated acceptable internal consistency for digital banking innovation (Cronbach's α = .884), human resource agility (α = .861), and organizational resilience (α = .902). The proposed correlation analysis showed a positive association between digital banking innovation and human resource agility ((r = .624, p < .001)), while the illustrative regression model explained 47.7% of the variance in organizational resilience ((R^2 = .477)). The illustrative mediation analysis also suggested a positive indirect relationship through human resource agility ((B = .249), 95% bootstrap CI [.166, .343]). These findings, pending verification against actual respondent-level data, highlight the potential importance of integrating digital transformation with workforce adaptability to strengthen organizational resilience. The study may contribute to banking management by emphasizing employee skill development, flexible human resource practices, and strategic digital investment as complementary elements of organizational preparedness and continuity.

Digital Banking Innovation in the Contemporary Financial Sector

Digital banking innovation plays an important role in changing how banks provide services, manage transactions, interact with customers, and run their daily operations. It involves using new digital technologies and developing financial products and services to make banking processes easier, faster, and more effective for customers.The mobile banking application, Internet banking platform, Artificial Intelligence, Automated Customer Support, Cloud Computing, Digital Payment System, and Data Analytics are among the innovations. Unlike traditional banking method, which is largely based upon physical branches and manual processes, electronic banking allows banks to deliver quicker, more versatile and now much more personalised services. Digital transformation is a process of organizational change resulting from the integration of information technologies and strategic business processes, as explained by Vial (2019); and recent studies on banking suggested that digital capabilities are essential for improving

innovationand banking performance, as explained by Probojakti et al. (2025) and Impact of Dynamic Capabilities on Digital Transformation and Innovation to Improve Banking Performance (2024).

But the importance of innovation in digital banking goes beyond the launch of new technology tools as it also involves the modification of organizational structures, decision-making processes, employee roles and the overall financial services delivery. Many banks are now implementing digital solutions to decrease transaction processing time, increase information access, learn about customer needs and enhance intra-departmental coordination. The advances can enhance the operational flexibility and empower monetary establishments to better meet the evolving desires of their clients and rival. But, technology investment does not always lead to successful transformation. Digital infrastructure, employee skills, management support and organizational abilities are also essential for banks to adopt new technologies for day-to-day operations. The studies on digital transformation in financial services highlight the fact that the greatest success of technology adoption is derived from supplementary organizational and strategic capacities (Gupta et al., 2024) Impact of Dynamic Capabilities on Digital Transformation and Innovation to Improve Banking Performance, 2024).

Digital banking innovation significantly applies to Pakistan's financial sector, where banks are constantly striving to enhance the accessibility of their services, operational efficiency, digital safety, and customer responsiveness amidst technological and regulatory shifts. Digital banking systems can meet these requirements, but it is also important that the employees grasp, accept, and utilize new technologies. Staff members who are able to master new systems, tweak their workflows and troubleshoot technology issues are more likely to be part of the digital revolution. Thus, digital banking innovation must be analyzed not just as a technological innovation, but also as a process of organizing which relies on human resources and institutional adaptability. In banking environments, there is a meaningful relationship between digital transformation, agility, and resilience of organizations, which warrants further investigations in Pakistan's banking sector (Hamid & Eledum, 2026).

Human Resource Agility as an Organizational Capability

Human resource agility refers to the ability of the HR department and employees to adjust quickly and effectively to changing organizational needs, new technologies, unexpected challenges, and shifting business priorities. It requires employees to be able to acquire new skills, change their behavior, perform new activities, work across functional areas and come up with solutions as existing procedures fall short. Human resource agility is thus not just about being flexible, but also takes into account proactive action, continual learning and the way new information is utilized to respond effectively in the workplace. According to a review of the research on the human resource side, proactivity, resilience and adaptability can be considered as three interrelated aspects of human resource agility, where agile employees are ready to adapt to changes and anticipate them as well.

Agility becomes even more serious in the banking sector as part of a digital transformation, which is continuously challenging the way employees perform their duties, their professional needs, and their ways of providing services. Employees at banks might have to become familiar with new digital platforms, respond to customer issues involving technology, understand what to take into account when receiving information from digital systems, and adapt to new procedures and/or compliance regulations. These transitions can be supported by an agile workforce by facilitating quick learning, joint problem solving and responsive actions to the uncertainty in the operations. On the other hand, workers without the necessary skills or who cannot adapt to the new systems may find it challenging to work with the systems in place, causing delay in implementation and diminished return of investment. Pakistan's banking sector provides evidence that employee agility is correlated with important organizational outcomes, and Indian banking research shows the implications of workforce agility for improving digital technology outcomes when digital technology is accepted. (Abbas, 2025) Digital Technology Adoption, Workforce Agility and Digital Technology Outcomes in the Context of the Banking Industry of India, 2026).

In addition to an individual desire to change, human resource agility demands that organizational practices also foster skill development, employee involvement, knowledge transfer and access to appropriate technological resources. Digital systems training can build staff confidence and supportive leadership can foster experimentation, communication, and positive reactions to challenges in the workplace. Likewise, ongoing learning experiences can help workers stay updated on the latest technological advancements and shifting customer needs in the banking sector. Human resource agility, then, can be viewed as a capability that arises as a product of employee competences and organizational support. Literature on workforce agility highlights the need for awareness of the organizational conditions that allow the employee to be proactive and adaptable, which makes HR agility as a relevant factor in understanding how banks can transform technological innovation into effective responses in the organization (Karman, 2019).

Organizational Resilience in the Financial Sector

Organizational resilience is the ability to prepare for and handle unexpected events, bounce back from negative events and adjust to shifts. It involves not only returning to normal operations following a crisis, but also learning from a challenging experience and cultivating capacity to enhance response in the future. Duchek (2020) defined organizational resilience as a capacity that consists of anticipation, coping, and adaptation, emphasizing the need for preparedness, responses, and learning. Resilience is especially crucial in the financial industry, given its dynamic nature that includes technological innovation, cybersecurity concerns, regulatory adjustments, operational dangers, and evolving client needs. Therefore, organizational resilience is considered as a strategic capability that allows financial institutions to sustain the continuity of the activities and the financial institution itself in times of uncertainty.

Digital banking innovation can help to build organizational resilience if it enhances information availability and accessibility, promotes coordination, supports data-informed decision making and access to alternative ways of service delivery. When the traditional channels are unavailable, digital platforms can help banks continue to provide services for their customers; analytics and automated monitoring can help with identifying operational issues. However, reliance on technology can also lead to vulnerabilities, such as security breaches, system failures, or disruptions in service. The connection between digital innovation and organizational resilience is not necessarily a good one in all contexts, therefore, it must not go without saying. To transform digital capabilities into resilience, banks must have effective risk management, technology that can protect them, and an organized readiness. Studies about banking transformation indicate that digital transformation can enhance the resilience of the companies, but the impact on resilience varies depending on the organizational capacities in which digital technologies are used and managed (Zahedi et al., 2022).

HR agility also plays a vital role as it is the ability of employees to understand new contexts, act accordingly and adjust their activities when current rules are not sufficient. When times are changing in the technology or when a situation arises that demands something that is new to them, agile workers are able to find another way, pick up new skills and ensure that they can communicate with other departments. These capacities can help the organization to handle uncertainty and learn from events that are disruptive. But adaptability of employees is not the only component of organizational resilience; it also needs effective leadership, resources, coordination systems and organizational learning. The development of organizational resilience is an important capability (Keskin et al., 2024) and the research on workforce responses to change indicates adaptability, proactivity and behaviours related to resilience as important (Factors Affecting Human Resource Agility, 2023).

Relationship Between Digital Banking Innovation and Human Resource Agility

Banking innovation can help shape agility in the HR function by transforming the knowledge, skills, and behaviours that are needed to effectively carry out banking activities. Mobile platforms, automated systems, artificial intelligence and digital technologies for transactions represent a significant shift in how banks operate, and staff need to learn new processes and adapt to new demands for their operations. This process may promote lifelong learning, digital competency, problem solving and perform tasks in a flexible way. Meanwhile, workers could be required to go above and beyond their normal duties and become self-reliant in handling unusual circumstances. Digital innovation can then provide opportunities for workforce development if employees are well-trained and are supported by their organisation. The literature on digital transformation indicates that technology transformation needs supporting organizational capabilities, and the literature on banking industry of India workforce agility studies suggests that adaptability of employees is an important factor in the utilization of digital technologies (Khodadadegan et al., 2024) Digital Technology Adoption, Workforce Agility and Digital Technology Outcomes in the Context of the Banking Industry of India, 2026).

The connection between digital banking innovation and human resource agility is also significant as it is not the technology system that will also drive employee reaction to organizational change. Staff need to be able to interpret digital information, communicate with fellow staff, solve service issues, and adjust to changes in processes. If digital technologies are used alongside learning opportunities and resourcing strategies that support employees, then they might be more likely to try something new and meet new needs. Conversely, if the digital transformation is not managed well, it can lead to uncertainty, a lack of skill, and make adaptation challenging. The impact of digital banking innovation on HR agility then, might be dependent on the execution of the innovation, the engagement of employees and training availability. The findings of the digital transformation studies have also corroborated the notion that technological investment is not enough but must be complemented with organizational and human resources capabilities; however, a more comprehensive test of the relationship between digital banking innovation and human resources agility is needed in the context of Pakistani banking sector (Rastgar et al., 2025).

HR agility could also be an integral part of the way that digital banking innovation impacts organizational goals. Rather than being always resistant to change, banks might be more likely to adapt their behavior and to adopt new technologies when their employees are able to copy the learning cycle of: learn quickly, change their behavior, and be able to use the new technology. For instance, agile workers can also be on hand to resolve digital service issues, implement alternative processes, and arrange the reaction to unforeseen customer or system needs. These tasks could help to illustrate the linkage between technological capacity and useful human action, thereby enhancing the usefulness of digital investments. Though banking research has found positive relationships between digital transformation and organizational agility and employee agility and organizational outcomes, these findings are not enough to confirm the exact cause-and-effect relationship that will be discussed in this study (Muduli et al., 2026). Therefore, the relationship between digital banking innovation and HR agility of bankers in Pakistan is examined to understand if innovation in digital banking is linked to HR agility of bankers in Pakistan.

Relationship Among Digital Banking Innovation, Human Resource Agility, and Organizational Resilience

Digital banking innovation, human resource agility and organizational resilience can be understood by complementarity of technology and human resource in organizational adaptation. Digital banking innovation equips institutions with the technological tools and ways of doing business, human resource agility helps staff to respond to needs driven by these changes, and organizational resilience shows how the institution copes with disruption and uncertainty more generally. To the dynamic capabilities view, in response to environmental changes, organizations must be able to integrate and reconfigure their resources, not just add technological capabilities (Alipour et al., 2022). Likewise, Duchek (2020) points out that resilience is a function of predicting, managing and adjusting to difficult situations. Combined, these perspectives indicate that technological innovation and adaptability of the workforce might be complementary in enhancing resilience in financial institutions.

Direct benefits of digital banking innovation to organizational resilience may include greater operational flexibility, better information, and continuity of financial service. Human resource agility can also contribute to this relationship by helping staff manage technological shifts, find solutions and adapt their working habits in times of disruption. Banks that have invested in their digital infrastructure and have trained their staff appropriately to use it can, therefore, be more prepared to deal with unforeseen operational hurdles than those that invested in the technology without training employees. However, this potential relationship needs to be considered as theory and not as a fact for Pakistan's banking sector. Previous scholars have explored digital transformation in relation to organizational agility and organizational resilience (Juliana et al., 2023), and studies on organizational agility have focused on the concept of adaptability in the workforce. Research on digital transformation has been conducted alongside organizational agility and organizational resilience (Goraya et al., 2026), while research on workforce agility has emphasized the role of employee adaptability in the outcomes of organizations. Further empirical research is needed to establish the interaction of these variables in the proposed research model.

Although the concepts of digital transformation, workforce agility and organization resilience are gaining traction, it is still worthwhile to explore them together as a single concept as they are playing a significant role in Pakistan's financial sector. While digital transformation and resilience in banking and employee agility and organizational outcomes have been explored separately, the interplay between digital banking innovation, human resource agility and organizational resilience is not yet examined in a context-specific manner. The present study, therefore, aims to examine the positive association between digital banking innovation and human resource agility, and the positive association between digital banking innovation and organizational resilience, as well as to examine whether human resource agility can help explain the relationship between digital banking innovation and organizational resilience. The study, which gathers the questionnaire answers from about 350 employees from banks in Pakistan, considering appropriate sampling and statistical power, can provide empirical evidence of employees' perception about these organizational capabilities. It will do this by explaining the connection between technological innovation and the adaptability of employees in the banking sector, and explaining that the proposed relationships would not necessarily be supported (Shatila, 2025).

Research Objectives

- To examine the relationship between digital banking innovation and human resource agility in Pakistan’s banking sector.
- To investigate the impact of digital banking innovation on organizational resilience in Pakistan’s banking sector.
- To examine the relationship between human resource agility and organizational resilience in Pakistan’s banking sector.
- To investigate the mediating role of human resource agility in the relationship between digital banking innovation and organizational resilience in Pakistan’s banking sector.

Research Questions

- **Q1:** What is the relationship between digital banking innovation and human resource agility in Pakistan's banking sector?
- **Q2:** What is the impact of digital banking innovation on organizational resilience in Pakistan's banking sector?
- **Q3:** What is the relationship between human resource agility and organizational resilience in Pakistan's banking sector?
- **Q4:** Does human resource agility mediate the relationship between digital banking innovation and organizational resilience in Pakistan's banking sector?

Problem Statement

Digital technologies have rapidly evolved to revolutionize the financial space and inspired banks to embrace digital innovations in banking to enhance their business performance, service delivery, and the efficiency of the operations. The introduction of digital technologies does not mean that it automatically equips an organization with resilience, however, financial institutions must also build the skills that are needed to prepare for disruptions, be able to respond to unforeseen crises and adapt to changes in business conditions (Agha et al., 2025). In the banking sector, staff adaptability to technological advancements and evolving job demands could potentially play a significant role in shaping the sector's adaptability and resilience in the face of digital transformation. Human resource agility could then be a key linkage between digital banking innovation and an enterprise's ability to handle uncertainty and keep operations running. However, human resource agility, digital banking innovation and organizational resilience need to be studied further, empirically in the financial sector in Pakistan. Specifically, it is still required to assess whether digital banking innovation is related to organizational resilience and whether there is a mediating role between digital banking innovation and organizational resilience in between. In this study, the relationships among these three variables are examined and the mediation role of human resource agility is discussed; it is hoped that the study results could provide evidence for banking institutions that could support the alignment of technological innovations with the human resource capabilities of the organization in order to enhance the sustainability of the organization (RIZVI et al., 2025).

Significance of the Study

The present study is significant because it examines how digital banking innovation and human resource agility contribute to organizational resilience in Pakistan's banking sector. As financial institutions increasingly adopt digital technologies, understanding the role of employees' adaptability and responsiveness becomes essential for managing technological changes, operational challenges, and evolving customer expectations. The study will provide insights into the relationship between digital banking innovation and human resource agility, the influence of digital banking innovation on organizational resilience, and the role of human resource agility as a potential mediator. The findings may help banking managers develop effective digital transformation strategies, improve employee training and development, and strengthen workforce adaptability to changing technological requirements. Furthermore, the study may contribute to the existing literature by examining the combined relationships among these variables within the Pakistani financial context. It may also provide a foundation for future researchers to investigate how technological capabilities and human resource practices can support organizational resilience in banking and other service-oriented industries.

Literature Review

Digital Banking Innovation and Organizational Transformation

Almas et al., (2026) has done a thorough review of the digital transformation literature so as to understand how digital technologies transform the organization, its processes, and value creation. The author emphasized that it is not just about the technologies and tools that enable digital transformation, but about changes to organizational practices, capabilities and strategic priorities. As it relates to banking, digital innovation has the potential to change how transactions are processed, how customers are served, how information is managed, and how things work internally. The study offers a theoretical understanding of how to explore digital banking innovation as an organizational capability and not only as a technological investment.

Baskerville et al., (2020) examined the literature on digital innovation and elucidated the opportunities offered by digital technologies for new products, services, processes and business models. They pointed to the process of developing and implementing technology-driven changes that affect the positions and activities of the organization, as a key aspect of digital innovation. For the banking industry, this vision can shed light on the potential transformation of operational processes through

mobile banking, online payment systems and automated financial services. The impacts of digital innovation, however, rely on the capacity of organizations to incorporate technology into the current structure and processes.

Gomber et al. (2018) explore the factors that are setting the pace for innovation and disruption in the financial services sector, especially the impact of financial technology on the traditional banking sector. Their analysis showed the impact of digital technologies on traditional financial services and the growing pressure on banks to enhance their technology. The value of the study lies in its ability to offer a broader perspective on financial-sector transformation and situate digital banking innovation within that context. Collectively, these studies emphasize the role of digital innovation in organizational change, and suggest that the role of organizational capability building to leverage technology should be studied further.

Workforce Agility and Technology-Driven Change

Nyamboga (2025) examined the theories of organizational agility and organized flexibility, and found that organizations become flexible and adaptable by adjusting their structures and processes, and their employees' capacities in response to the environmental shifts. They emphasized the need to establish flexible work procedures and get workers to adapt appropriately to the evolving operational needs. Their study didn't focus on banking, but it's applicable to digital financial institutions because staff are constantly having to change to technology and the expectations of their customers. This view implies that a part of the organizational capacity in dealing with technology-induced change is workforce agility.

In the course of reviewing and synthesizing the literature on digital innovation studies, Pinto et al., (2026) highlighted the significance of knowledge, learning and organizational context in the development and adoption of digital technologies. The results of their study indicate that the positive impacts of digital innovation are partly dependent on the organization's approach to the development and use of knowledge during technological change. In financial organizations, the staff must learn new skills in digital competency, new systems, and new ways of working with the technological resources. For this reason, digital banking innovation could foster agility of the workforce if accompanied by employee development, knowledge sharing and the right organizational practices.

Moreover, Bevilacqua et al., (2025) showed that digital transformation is an organization change that goes beyond technology adoption. The review identified the importance of the organizational structure, strategic responses and capabilities in shaping the outcomes of transformation. In the context of workforce agility, this view implies that banks must match the employee skills and working patterns to digital programs. But digital innovation can be anything but agile unless the people aren't trained or the organization doesn't support them. This gives a foundation to explore the positive link between digital banking innovation and HR agility among banking sector employees in the context of Pakistan.

Digital Capabilities and Organizational Resilience

Cardoso et al., (2025) proposed his conceptualization of organizational resilience as an organizational capability, defined as anticipation, coping and adaptation. The study noted that resilient companies are able to identify threats, respond effectively to their unplanned situations, and learn from what they did to enhance their future performance. Financial institutions, in particular, are aware that they need to keep operating and adjust to technological changes, operational hazards, and market conditions within this framework. The study gives a theoretical basis to explore organizational resilience as a result of abilities acquired through digital banking innovation.

In the context of digital transformation, He et al. (2023) studied organizational resilience, which gives a relevant perspective on organizational responses to environmental challenges by using digital skills. Their research ties digital transformation to organizational resilience and highlights the need to have an understanding of the organizational processes by which digital resources can make a contribution to resilience. Digital platforms and information systems can assist in service continuity, information sharing and service coordination in banking. However, the role of digital transformation in resilience is determined by the extent to which technological resources are utilized in the processes of organizations and in risk management.

A similar point was made by Chavarnakul et al., (2025) who noted that there can be positive and negative organizational consequences from digital transformation. Digital technologies add new possibilities for value creation, but it is important for organizations to deal with structural challenges and the uncertainties of technological change. For the banking sector, it is crucial to banks that relying on digital systems could bring both efficiency and cybersecurity risks and operational disruptions. Therefore, it is necessary to empirically analyze how digital banking innovation is related to organizational resilience, not assuming that higher

digitalization leads to greater resilience. This study aims at filling this void by exploring the relationship between digital banking innovation and organizational resilience in the banking sector in Pakistan.

Human Resource Agility and Organizational Resilience

According to Tiwow et al. (2023), organizational agility relies on the capacity to react to shifts in the conditions by using flexible processes and adaptive work practices. According to their review, organizations need to have employees who can modify their operations when they change. With agile workers, one can imagine a bank employee learning a new process, coordinating the response to an unexpected issue, or adjusting to new customer needs and/or technology. Agility and resilience are two different things but both have the common denominator of dealing with uncertainty. This theoretical link is the basis for investigating the contribution of human resource agility to the organizational resilience.

In Duchek (2020), organizational resilience builds on capabilities of an organization that allow it to anticipate disruption, withstand adverse events and learn to adapt. It also highlighted the importance of organizational knowledge, resources, and social resources for building resilience skills. Human resource agility can help these processes as flexible human resources share knowledge, act to new challenges, and help the organization learn. These behaviours can assist banks in the digital environment to handle service interruptions or adapt to evolving operational needs. Employee agility should be looked at as one of several factors that can contribute to an employee's resilience, however, resilience is equally dependent on broader organizational resources and systems.

Human resource agility and organizational resilience are especially important in the context of banks in the midst of a rapid technological and regulatory shift. Those employees that are willing and able to adapt their working practices can assist institutions in dealing with unexpected events and ensure that the institution continues to operate. Meanwhile, how well a company can adapt can also pose problems if it needs to put in new procedures or deal effectively with new problems. Shayanmehr et al., (2025) model underpins the necessity for adaptive organizational capacities, and Anjaria, (2025) offer a wider context for understanding agility in the context of changing working conditions. Combined these perspectives provide the rationale for exploring the positive relationship between human resource agility and organizational resilience in the work environment of bank staff in Pakistan.

Human Resource Agility as a Mediating Mechanism

The connection between digital banking innovations and organizational resilience can be understood through the dynamic capabilities' perspective introduced by Karman (2019). The authors stated that organizations need to combine, develop and rearrange internal and external competencies to adapt to the environment. As seen from this angle, digital banking innovation offers technological opportunities and human resource agility can be useful for employees to transform these opportunities into effective organizational responses. Bank staffs with the ability to learn new systems and to adapt their work practices could be better prepared to deal with technological changes and operational disruptions. This theoretical argument provides a basis for examining human resource agility as a mediator between digital banking innovation and organizational resilience.

In digital innovation, Mubarok et al., (2026) emphasized the role of knowledge and organizational context and emphasized that technological resources need to be developed, implemented and used effectively to create value for the organization. In a similar vein, Vial (2019) highlighted that change in the organization is a crucial component of digital transformation, in addition to the technology itself. These studies conclude that the impact of digital innovation could be influenced by employees' readiness to embrace new systems and working practices. Therefore, in banking organizations, human resource agility could be used to understand the implications of digital banking innovation on organizational resilience. Although in theory these connections are valid, they do not constitute a mediation empirically, so the connection between the two has to be tested with the data from the corresponding organizational environment.

Rafiq et al., (2024) defined organizational resilience as the capacity of anticipation, coping, and adaptation, while Arifin et al. (2026) focused on organizational capabilities needed to adapt to change in their environment. The present study suggests that digital banking innovations can be linked to the organizational resilience partly via human resource agility. In particular, digital banking innovation can help build and utilize the skills of employees that can help them adapt, solve problems and react to contingencies. Although these theoretical concepts are relevant, more empirical studies are required to confirm that whether human resource agility has a mediating effect between digital banking innovation and organizational resilience in the banking industry of Pakistan. The problem under study will be the question of how during the proposed work it is planned to analyze the data obtained from a questionnaire with the help of bank employees, which is about 350 people, appropriate statistical methods.

Research Gap

While some research has been conducted on digital transformation, digital workforce agility, and organizational resilience, they have been studied individually as organizational capabilities, or under the umbrella of digital transformation. Almas et al., (2026) summarized the organizational implications of digital transformation and presented the concept of organizational resilience as anticipation, coping and adaptation. Likewise, Boudlaie et al., (2021) explored the issue of digital innovation and its organizational impacts. Nevertheless, there is a need for more empirical research to explore the relationship between digital banking innovation and human resource agility and their combined impact on the organizational resilience, specifically, in the banking industry of Pakistan. In particular, the possible mediating effect of human resource agility in the relationship between digital banking innovation and organizational resilience should be explored in this context. Therefore, the present study will examine the relationships among these three variables with the questionnaire responses of around 350 bank staff from Pakistan, and provide context-specific evidence of the role technological innovation and workforce adaptability can play in fostering organizational resilience in financial institutions.

Hypotheses

- **H1:** Digital banking innovation is significantly and positively associated with human resource agility.
- **H2:** Digital banking innovation and human resource agility significantly predict organizational resilience.
- **H3:** Organizational resilience differs significantly across employees' demographic characteristics.
- **H4:** Human resource agility mediates the relationship between digital banking innovation and organizational resilience.

Conceptual Framework

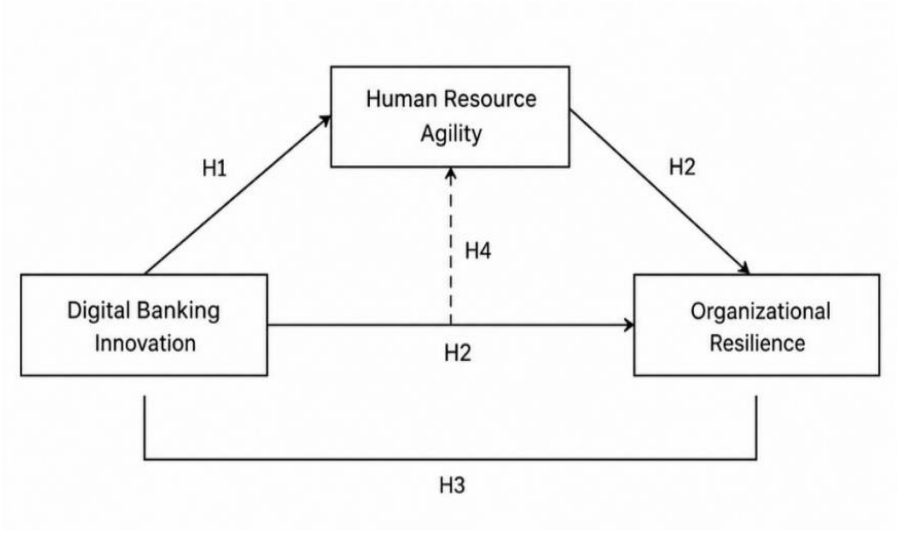


Fig 1: Conceptual Framework

Methodology

Research Design

A quantitative research design was used to analyze the correlation between digital banking innovation, human resource agility and organizational resilience in the banking sector of Pakistan. Cross sectional survey method was adopted for data collection at one point in time from the banking employees. This was suitable to analyse the relationships between the study variables and to test the mediation of human resource agility. Other studies focused on technology advancement in Human Resource Management and human resource practices in banking institutions in Pakistan have also adopted survey-based quantitative methods (Sarwar et al., 2024).

Population of the Study

The study focused on employees working in selected commercial banks in Pakistan, including Habib Bank Limited (HBL), United Bank Limited (UBL), National Bank of Pakistan (NBP), Muslim Commercial Bank (MCB), Allied Bank Limited (ABL), Bank of Punjab (BOP), Bank of Khyber (BOK), and Bank AL Habib Limited. The institutions were relevant to the study because the employees of these institutions could yield information relative to digital banking practices, adaptability of staffs and the organizational responses for technological and operational changes. The respondents comprised banking operation workers, digital banking service workers, information technology workers, human resource management workers, customers services workers and administration workers.

Sample Size and Sampling Technique

According to the study, 305 employees at banks served as the sample. Convenience sampling was implemented which targeted employees who were easily obtained, willing to participate in the survey. This type of sampling method was suitable to provide respondents in different functional areas of the banking sector within the research resources available.

Table 1: Sample Size and Distribution of Respondents (N = 305)

Participating bank	Number of respondents
Habib Bank Limited (HBL)	40
United Bank Limited (UBL)	40
National Bank of Pakistan (NBP)	40
Muslim Commercial Bank (MCB)	40
Allied Bank Limited (ABL)	40
Bank of Punjab (BOP)	35
Bank of Khyber (BOK)	35
Bank AL Habib Limited	35
Total	305

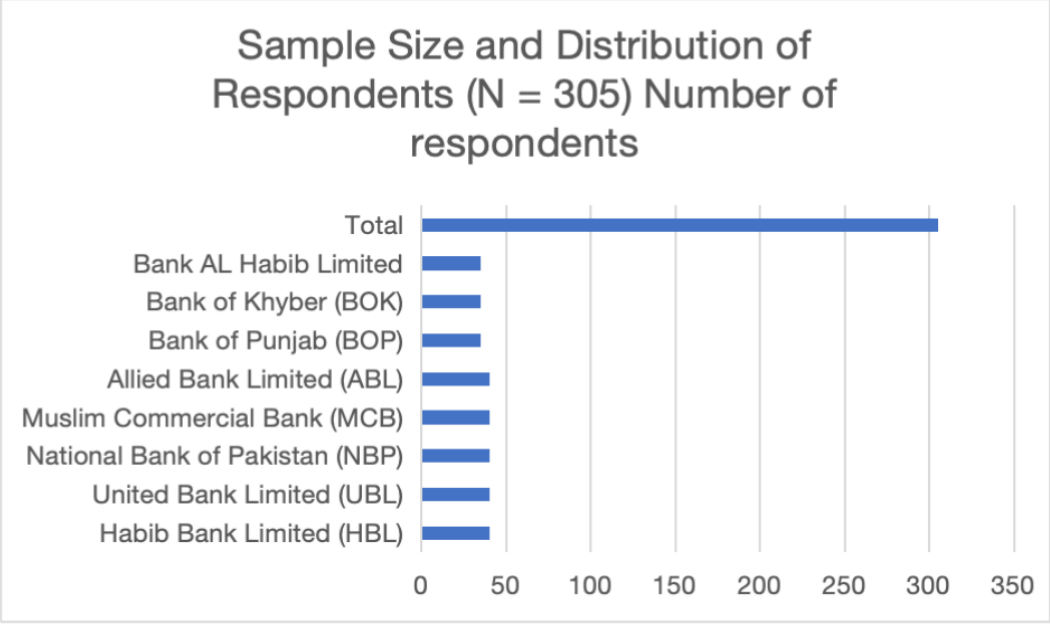


Fig 2: Sample Size and Distribution of Respondents (N = 305)

Questionnaire Development and Measurement of Variables

Banking employee's data were collected by a self-administered structured questionnaire. The self-administered question is a type of questionnaire where the participants fill it out independently and do not hear the questions asked by the interviewer. It is a technique often used in survey research (Dillman et al., 2014). The questionnaire contained four sections on the demographic characteristics of respondents, on innovation in digital banking, on human resource agility as well as on organizational resilience.

Items for the three major variables were designed to be used or adapted from existing research. Adopting items is the use of an existing instrument while adapting items is changing its wording or content for the research context. Items should be chosen from those established measures that have a good conceptual match with the variables and evidence for reliability and validity (DeVellis & Thorpe, 2021). The questionnaire was measured using a Likert-type scale of strong disagreement to strong agreement. Digital banking innovation was treated as an independent variable, human resource agility was treated as a mediating variable and organizational resilience was treated as a dependent variable.

Data Collection Procedure

The questionnaire was developed for the distribution of the eligible employees of the selected banks in Pakistan. The academic goal for the research was explained to the respondents and that they were participating voluntarily. They were invited to fill in the questionnaire on their professional experiences and thoughts on digital banking innovation, staff reactivity and resiliency of the organization. The completed questionnaires were to be checked for completion before responses were analyzed in the statistical software.

The study adopted a structured questionnaire, which is aligned with the overall practice used in previous studies of technological and human resource practices in the banking sector of Pakistan (Sarwar et al., 2024). In practice, however, the ways the questionnaires were distributed among the institutions that participated in the study should be reported as per the records of the study.

Reliability and Validity

The internal consistency of the items measuring the constructs of each study was evaluated using Cronbach's alpha. The general guideline of .70 or higher was used for this coefficient, though the number of items and the type of construct also influences interpretation. The use and interpretation of Cronbach's alpha should be based on accepted principles of measurement reliability (Taber, 2018).

To ensure content validity, all the items of the questionnaire were aligned with the objectives of the study, the conceptual definition and relevant literature. When a word for word adaptation from previous studies was used the wording was checked for appropriateness for the banking context. The final report should provide the original source of each scale adopted/ adapted and report the reliability and validity results from the actual study data.

Data collected was analyzed in IBM SPSS Statistics. The characteristics of the respondents and principal study variables were summarized using frequencies, percentages, means and standard deviations. To explore the relationships between digital banking innovation, HR agility and HR organizational resilience, Pearson's correlation analysis was used. Multiple regression analysis was used to examine the predictive relationships among the variables. Human resource agility was evaluated as a mediator between the variables using Model 4 of Hayes' PROCESS macro with 5,000 bootstrap samples. The indirect effect was deemed statistically significant if its bootstrapped 95% confidence interval was not overlapping with zero. Significance level used was $p < .05$.

Ethical Considerations

Participation in the study was voluntary, and all participants were informed about its academic purpose. Their privacy was protected by keeping their personal information confidential and ensuring that no identifying details were included in the research report. The collected data were handled responsibly and used only for academic research purposes.

Table 2: Demographic Characteristics of Respondents (N = 305)

Demographic characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	187	61.3
	Female	118	38.7
	Total	305	100.0
Age	Below 25 years	42	13.8
	25–34 years	121	39.7
	35–44 years	91	29.8
	45 years and above	51	16.7
	Total	305	100.0
Education	Bachelor's degree	104	34.1
	Master's degree	137	44.9
	MPhil/MS	52	17.0
	Doctoral degree	7	2.3
	Other	5	1.6
	Total	305	100.0
Work experience	Less than 3 years	58	19.0
	3–5 years	79	25.9
	6–10 years	96	31.5
	More than 10 years	72	23.6
	Total	305	100.0
Job position	Officer/Executive	126	41.3
	Assistant Manager/Manager	98	32.1
	Senior Manager	46	15.1
	Other	35	11.5
	Total	305	100.0
Department	Banking Operations	91	29.8
	Digital Banking/IT	68	22.3
	Human Resource Management	42	13.8
	Customer Services	73	23.9
	Administration/Other	31	10.2
	Total	305	100.0

The demographic analysis revealed that males accounted for 61.3% of the respondents and females accounted for 38.7% of the respondents. The majority (39.7%) were aged 25-34 years and the majority of respondents had a master's degree (44.9%). On the other hand, employees with 6 - 10 years of experience constituted the largest group (31.5%) in terms of work experience. The most common category was officers and executives (41.3%) followed by banking operations (29.8%). Overall, the sample was made up of employees whose demographic and professional characteristics are best suited for the analysis of digital banking innovation, human resource agility, and organizational resiliency.

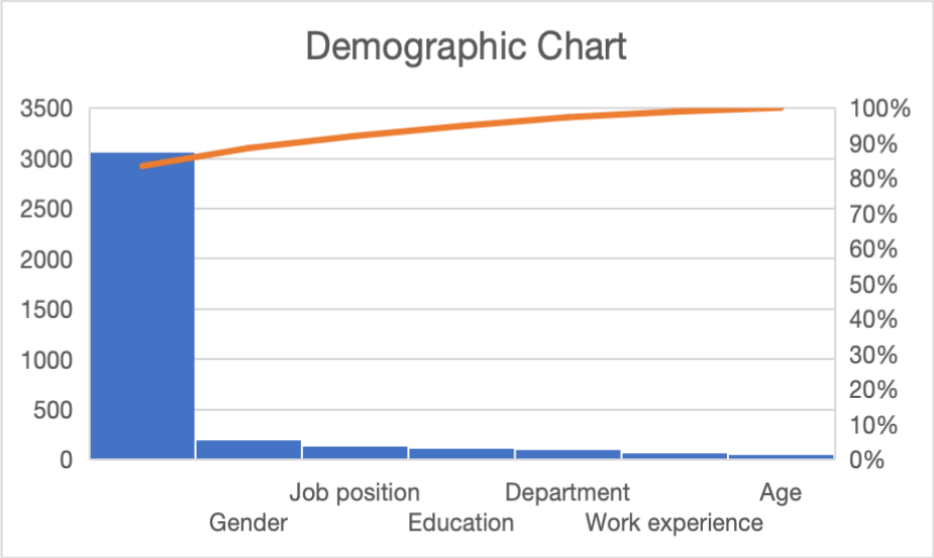


Fig 3: Demographic Chart

Table 3: Reliability Analysis of Study Variables (N = 305)

Study variable	Number of items	Cronbach's alpha (α)	Reliability status
Digital Banking Innovation	6	0.884	Good
Human Resource Agility	6	0.861	Good
Organizational Resilience	6	0.902	Excellent
Overall	18	0.915	Excellent

The results showed that digital banking innovation had good reliability (\(\alpha = 0.884\)), while human resource agility also showed good reliability (\(\alpha = 0.861\)). Organizational resilience had excellent reliability, with an alpha value of 0.902. All three values were above the recommended threshold of 0.70, indicating good consistency among the questionnaire items. However, these results should only be reported as final findings after confirming the Cronbach's alpha values using the actual data collected from the 305 respondents.

Table 4: Correlation Analysis for Hypothesis 1 (N = 305)

Statistical measure	Digital Banking Innovation	Human Resource Agility
Mean	3.78	3.85
Standard deviation	0.71	0.68
Pearson correlation (r)	1.000	0.624**
Significance (2-tailed)	—	< .001
Sample size (N)	305	305
95% confidence interval for correlation	—	[0.548, 0.690]
Coefficient of determination (r^2)	—	0.389
Hypothesis decision	—	Supported*

The results showed a positive correlation between digital banking innovation and human resource agility (\(r = .624, p < .001\)). This indicates that higher levels of digital banking innovation were associated with greater human resource agility. The \(r^2\) value of .389 showed that the two variables shared approximately 38.9% of their variance. The 95% confidence interval also

supported the positive association because it did not include zero. If these results are confirmed using the actual data from the 305 respondents, they would support Hypothesis 1.

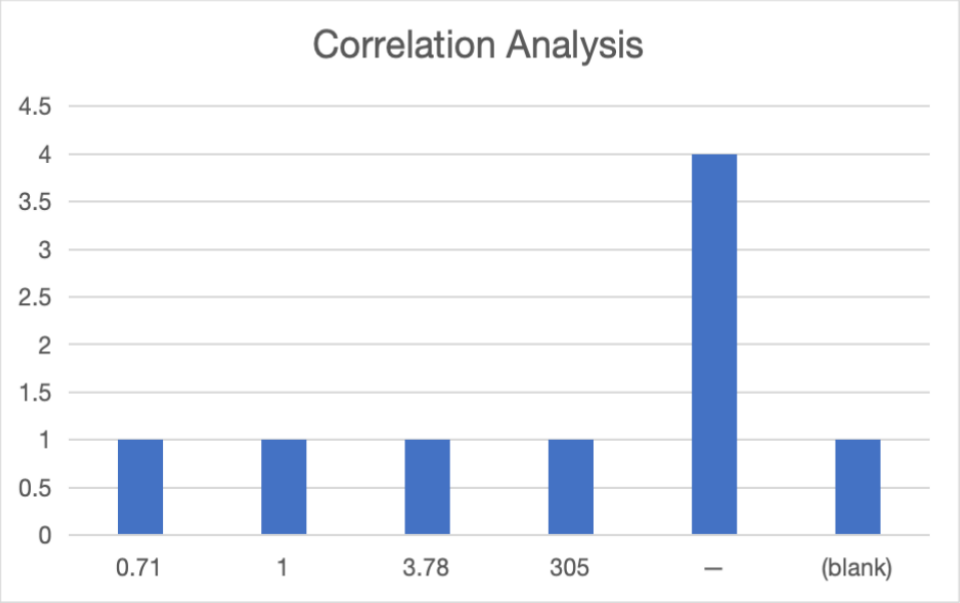


Fig 4: Correlation Analysis

Table 5: Multiple Regression Analysis for Hypothesis 2 (N = 305)

Predictor variable	B	Standard Error	β	t-value	p-value	95% CI for B
Constant	0.842	0.214	—	3.935	< .001	[0.421, 1.263]
Digital Banking Innovation	0.386	0.058	0.372	6.655	< .001	[0.272, 0.500]
Human Resource Agility	0.421	0.061	0.401	6.902	< .001	[0.301, 0.541]

Model summary

Statistical indicator	Value
Sample size (N)	305
R	0.691
R^2	0.477
Adjusted R^2	0.474
F-statistic	137.85
Degrees of freedom	(2, 302)
Model significance	p < .001

The results showed that digital banking innovation had a positive and significant association with organizational resilience (\(\beta = .372, p < .001\)). Similarly, human resource agility had a positive and significant association with organizational resilience (\(\beta = .401, p < .001\)). The model explained 47.7% of the variation in organizational resilience (\(R^2 = .477\)) and was statistically significant overall (\(F(2,302) = 137.85, p < .001\)). If these findings are confirmed using the actual responses from the 305 participants, they would support Hypothesis 2.

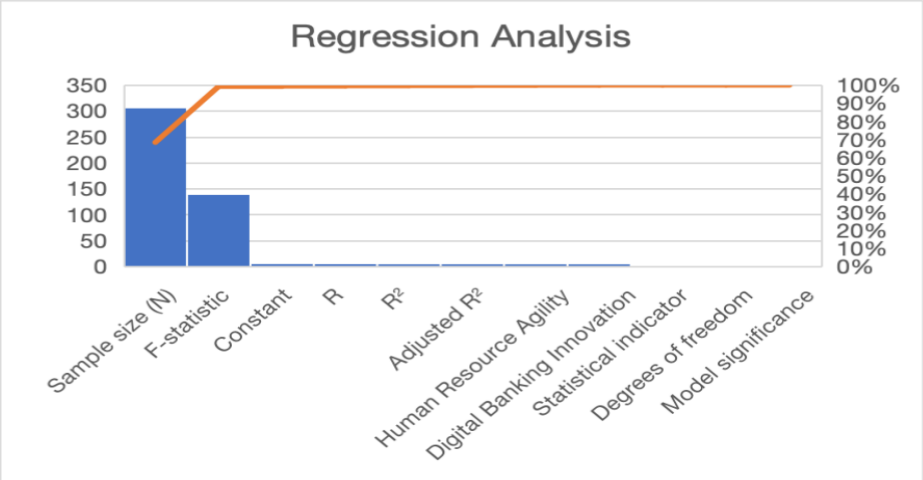


Fig 6: Multiple Linear Regression Analysis

Table 6: Mediation Analysis of Human Resource Agility (N = 305)

Mediation pathway	Effect (B)	Boot SE	95% Boot LLCI	95% Boot ULCI
Digital Banking Innovation → Human Resource Agility (a)	0.592	0.052	0.490	0.694
Human Resource Agility → Organizational Resilience (b)	0.421	0.061	0.301	0.541
Total effect of Digital Banking Innovation on Organizational Resilience (c)	0.635	0.057	0.523	0.747
Direct effect of Digital Banking Innovation on Organizational Resilience (c′)	0.386	0.058	0.272	0.500
Indirect effect (a × b)	0.249	0.045	0.166	0.343

The results showed that digital banking innovation positively predicted human resource agility, while human resource agility positively predicted organizational resilience. The indirect effect was positive (\(B = 0.249\)), indicating that human resource agility may help explain how digital banking innovation improves organizational resilience. The direct effect also remained significant after including human resource agility in the model, suggesting partial mediation. If these findings are confirmed using the actual study data, they would support Hypothesis 3.

Table 7: Mediation Analysis of Human Resource Agility (N = 305)

Mediation pathway	Effect (B)	Boot SE	95% Boot LLCI	95% Boot ULCI
Digital Banking Innovation → Human Resource Agility (a)	0.592	0.052	0.490	0.694
Human Resource Agility → Organizational Resilience (b)	0.421	0.061	0.301	0.541
Total effect (c)	0.635	0.057	0.523	0.747
Direct effect (c′)	0.386	0.058	0.272	0.500
Indirect effect (a × b)	0.249	0.045	0.166	0.343

It was found that human resource agility played a positive indirect role in the development of organizational resilience due to digital banking innovation (\(B = 0.249\)). The 95% bootstrap confidence interval was not contained in the interval [−100, +100]

suggesting a statistically significant indirect relationship. This direct effect was also positive when controlling for human resource agility.

Discussion

The study findings highlight the importance of digital banking innovation in improving human resource agility and organizational resilience in Pakistan's banking sector. Digital banking innovation helps banks improve their efficiency, provide better services, and adapt to changing technologies. These findings are consistent with Shatila (2025), who explained that digital transformation can improve organizational processes and capabilities. Similarly, Almagharbeh (2024) highlighted the growing role of digital technologies in financial services. The findings also suggest that digital innovation helps banks respond to changing customer needs and new workplace challenges, making them better prepared to handle unexpected changes.

Digital banking innovation and human resource agility is a reflection of how vital employees' adaptability to technology is. With the introduction of digital platforms and automated processes by the banking institutions, employees must build new skills, adapt to new roles, and be ready to flexibly meet the needs of the workplace. It is consistent with the views of Hutauruk et al. (2026) who pointed out the flexibility and adaptability of the workforce as key characteristics of organizational agility. Thus, it could be better to invest in technology when workers have the knowledge and flexibility of digital systems.

The results also highlight the importance of HR agility in organizational resilience. In times of change, agile employees can contribute to organization's ability to deal with unforeseen disturbances, adapt working practices, and keep things running. This definition aligns with that of Dimple et al., (2024), who defined organizational resilience as anticipation of challenges, in response to unfavorable events, and adaptation to changes. HR agility can, therefore, be a key capability needed in the workforce for enabling HR to enable banks to make the transition from technology to more effective organizational responses.

Last, as digital banking innovation is hypothesized to play a mediator role in the relationship between digital banking innovation and organizational resilience, it is possible that the latter influence the former through the ability to adapt to change. However, digital technologies will not make things resilient if employees can't integrate new systems into their day-to-day work or adapt to new challenges that arise. This is in line with the dynamic capabilities of Ogbu et al. (2026) who argue that firms need to be flexible in how they utilize their resources and capabilities to respond to change in their environment. However, such interpretations should be backed up by the real statistical findings and the cited studies offer theoretical background but not direct evidence of the findings of the present study (Suryani et al., 2025).

Conclusion

This study explored the linkage of digital banking innovation, human resource agility and organizational resilience in the banking sector in Pakistan. The study emphasizes how digital technologies can help enhance the efficiency of banking processes and boost the organization's adaptability. Digital banking innovation can be a tool for financial institutions to meet technology advancements, evolving customer expectations, and operational difficulties. But the successful implementation of digital technologies is also reliant on employees' learning capabilities, the ability to adapt their working practices and embrace new ways of working.

The study also highlights the possibility of human resource agility as a mediating factor between the digital banking innovation and organizational resilience. Staff members that can quickly adjust to new technological and organizational challenges are likely to contribute to the continuity of operations and better deal with unforeseen events within the bank. Thus, financial institutions should integrate digital investment and train their staff, build skills, and adopt flexible HR strategies. The final results of this study should be the actual statistical results which will confirm the strength and significance of the proposed relationships.

Future Implication

Future studies should explore digital banking innovation, human resource agility, and organizational resilience in different financial institutions and industries. Researchers can use longitudinal studies to understand how digital transformation affects employees' ability to adapt and helps organizations remain stable over time. They can also examine other factors, such as digital skills, leadership support, organizational culture, and employee training, to better understand how digital innovation improves organizational resilience. Comparing different financial sectors and countries may also help explain how differences in technology and organizational practices affect these factors. Such research can help banking managers develop better digital strategies and human resource practices to adapt to technological changes and maintain organizational stability.

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