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Enhancing Financial Fortitude in Banking: Digital Transformation, Competitive Pressure and Financial Resilience

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Abstract

This study explores the relationship between financial resilience and digital transformation in Pakistan's banking industry, using competition pressure as a moderator and research and development (R&D) as a mediator. A 37-item questionnaire was designed to gather data on demographics and the main research variables. The findings show a strong positive relation between financial resilience and digital transformation, with competition pressure substantially moderating this link. However, research and development insignificantly mediate the relationship between digital transformation and financial resilience. This study underscores the significance of embracing digital transformation to strengthen financial resilience, providing insightful information for Pakistan's banking sector. This study, which is restricted to the banking industry within particular geographic parameters, provides insights that institutions can use to navigate the challenging terrain of digital transformation. It acts as a thorough manual for banks looking to maintain their resilience and competitiveness in the face of growing industry difficulties.

Keywords: Financial Resilience, Digital Transformation, Banking Industry, Competition Pressure, Research and Development, Pakistan Banking Sector

1. Introduction

The 2008 global financial crisis was the most catastrophic since the 1930s and had a profound effect on the global financial systems' landscapes. The crisis had a drastic effect on financial organizations' operating policies, market tactics, and financial patterns. Commercial banks were especially vulnerable to its effects. However, because of sensible credit policies and banking reforms over the preceding 20 years, Pakistan's commercial banks were able to withstand the intense effects of the global financial crisis. Although no bank or financial institution failed in Pakistan, the crisis did have noticeable impacts on the country's commercial banks' operational policies, practices, and financial performance (Nazir et al., 2012).

Banks have a unique role in the national economy since they act as a financial mediator, determining resource distribution; therefore, additional safeguards are required to ensure that they are not impacted by financial crises. To that aim, it is reasonable to say that the financial system plays a crucial role in the growth of the economy. In greater competitive contexts, concepts such as effectiveness and productivity take on equal importance. The global rivalry in the banking sector demands banks to use their resources more effectively. Like all other units in the economy, banks must take appropriate efforts to limit the loss caused by intense competition and other peripheral factors (Girginer & Uçkun, 2012).

The crucial need for financial resilience has been highlighted by the COVID-19 pandemic. Research shows that banks with greater financial resilience which is defined as diverse income streams, effective risk management, and strong capital buffers which were better positioned to handle the crisis (Demirgüç-Kunt et al., 2021). The banking system supports the economy's stability, particularly during the COVID-19 pandemic. Banks face significant pandemic risk due to rising loan hazards and non-performing debts. Unlike

earlier crises that provided warning signals before a recession, the COVID-19 epidemic has caught all economic entities off guard (Le et al., 2023).

This pandemic has created a need for digital banking to differentiate from competitors, save expenses, and boost consumer engagement. Studies also show that customers were more satisfied with digital banking than traditional banking and preferred the earlier (Vilhena & Navas, 2023). Digital transformation has led to improved financial risk management and higher efficiency, as observed in Chinese enterprises, where the integration of digital technologies helped mitigate financial risks (You & Zhao, 2023). To remain competitive, banks are implementing digital transformation initiatives under pressure from competitors. The introduction of digital finance reshapes competition structures, intensifying competition among banks, particularly small and medium-sized banks, which face major repercussions (Jia et al., 2023). Strong and efficient markets are primarily created by competition, which also boosts productivity, inspires innovation in businesses, and facilitates the effective use of available resources. A competitive environment makes sure that firms compete fairly and puts pressure on them all the time to provide the best selection of products at the best rates. Because of this, competition is the primary factor driving productivity development in all economies. Apart from enhancing quality, competition broadens the options available to consumers. Therefore, eliminating barriers to competition will lessen the chances of corruption and rent-seeking, thereby enhancing market efficiency and optimizing economic gains (Moyo, 2018).

R&D is crucial in driving digital transformation by developing innovative financial technologies and digital solutions. For example, banks invest in R&D to create new digital banking products and services, enhancing their market position and operational capabilities The level of R&D expenditure generally determines the effectiveness of digital transformation programs. Banks that prioritize R&D can better negotiate the challenges of digitalization, improving

their overall resilience and competitiveness (Wang & Chen, 2022).

Financial resilience, competitive pressure, digital transformation, and research and development (R&D) are all crucial to the modern banking business. Financial resilience ensures that banks can survive economic shocks by diversifying their income streams, managing risks effectively, and keeping strong capital buffers. Competitive pressure encourages innovation and service improvements, requiring banks to adopt new technology and strategies to stay industry leaders. Digital transformation improves operational efficiency, lowers costs, and satisfies client expectations for convenient and efficient banking services. Investing in R&D enables banks to create new products and services, meet increasing market demands, and remain ahead of technical advances. Effective digital transformation initiatives, backed by strong R&D activities, boost financial resilience and assist banks in navigating competitive pressures, assuring long-term success and stability.

The health of the banking industry depends on a stable macroeconomic environment primarily because it is difficult for banks to effectively assess credit risks when there is uncertainty about macroeconomic policies and shaky fundamentals like inflation and economic growth. Currently, the banking industry is by far the most significant component of the financial system overall and, as such, the primary source of risk to financial stability, especially in emerging economies (Swamy, 2011).

Theoretical Framework

Resilience Theory

Resilience theory states that having the right resources is necessary to effectively face stress, maintain adaptive behavior, and recover from both internal and external stress (Rutter, 1987; Werner, 1989). This theory, combined with the precautionary motive, suggests individuals save to smooth consumption over their lifetime and prepare for unexpected financial events. Research by Klapper

and Lusardi, (2020) explores how financial literacy and savings habits contribute to financial resilience. Carlson et al. (2012) describe resilience as an entity's ability to foresee, oppose, absorb, respond, adjust, and rebound from disruptions. This applies to assets, organizations, communities, and regions.

Businesses must build resilience so they can respond appropriately to unforeseen circumstances and take advantage of opportunities that may jeopardize their ability to survive (Lengnick-Hall et al. 2011). An ability to adapt, integrate, and restructure internal and external resources and skills to meet the demands of shifting conditions is possessed by resilient companies. An ability to adapt, integrate, and restructure internal and external resources and skills to meet the demands of shifting conditions is possessed by resilient companies. (Duchek, 2019).

Kendra and Wachtendorf (2003) assert that preparation is the key to an organization's resilience, keeping in mind that preparation isn't about a single incident but rather about building the skills and functions required to handle any kind of unforeseen circumstance. In his analysis of the Mann Gulch fire disaster, Weick (1993) cites four potential sources of resilience: improvisation and bricolage, virtual role structures, a wisdom mindset, and respectful engagement The resilient organization plans and executes effective activities to advance the organization, improving the likelihood of its survival. According to Charles Darwin, "It is not the strongest or most intelligent species that survive, but the most adaptable to change" (Duchek, 2019). Salter and Tarko, (2017) defines "robustness" as a system's ability to absorb huge shocks without significant negative consequences. Larger financial institutions that can fail without disturbing the system have greater financial absorptive ability. Secondly, recovery speed is another aspect of robustness. Certain systems recover more quickly than others, even when the shock has a significant initial impact.

Dynamic Capabilities Theory

Dynamic capabilities have been proposed as an idea to improve business performance using digital transformation regularly. Businesses operating in stable markets also need dynamic capabilities to adapt to changes in the market through resource acquisition, development, integration, and reconfiguration (Eisenhardt and Martin, 2000). The term 'dynamic capabilities' is emerging in strategic management. The basic assumption of the dynamic capabilities' framework is that core competencies should be used to modify short-term competitive positions that can be used to build a longer-term competitive advantage. Moreover, innovation is seen as a key driver in creating sustainable competitive advantages in the digital realm. For several reasons, dynamic capabilities provide an appropriate conceptual framework for comprehending digital transformation. First and foremost, they excel in adaptability to rapid change (Teece, 2014). Their main concern is an organization's capacity to swiftly integrate, restructure, and adapt both internal and external resources in situations that are changing quickly. This is an essential quality in the rapidly changing landscape of digital transformation, which is driven by technological advancements and market dynamics (Wewege et al., 2020).

According to Teece (2014), an organization's dynamic capabilities may be divided into three main categories: (1) identifying opportunities and risks; (2) acting on those opportunities; and (3) changing its business strategy and access to additional resources. . It has been specifically stated that in order for businesses to stay relevant in the rapidly developing digital economy, they must develop strong dynamic capabilities to quickly develop, deploy, and modify business models (Teece, 2018). Despite the extensive research on financial resilience, particularly through digital literacy, financial literacy, and digital financial innovation (He et al., 2022; Ariana et al., 2024; Hussain & Papastathopoulos, 2022). However, a significant gap remains in understanding the influence of

competitive pressure on the relationship between digital transformation and financial resilience. While previous studies have demonstrated a positive association between these variables and financial resilience, the specific impact of market pressures driving large firms to digitize. This unexplored research avenue presents an opportunity to analyze how competitive pressure mediates the relationship between digital transformation and firm performance, offering insights into the strategic decisions firms make to enhance their financial resilience in rapidly changing environments.

This study is important because it aims to fill these gaps by investigating the interactions between competitive pressures, digital transformation, R&D, and financial resilience. The study attempts to provide a thorough knowledge of how competitive pressures drive digital transformation while also analyzing the mediation role of R&D. Such insights are critical for organizations seeking to sustain a competitive advantage and achieve long-term financial stability in an environment marked by constant technological development and competition. This study aims to examine the influence of digital transformation on the financial resilience of banks, while also exploring the role of competitor pressure in shaping this relationship. Specifically, it seeks to determine whether digital transformation enhances banks' ability to remain financially resilient and whether competitor pressure moderates the link between digital transformation and financial resilience.This study holds significant importance for the banking sector by exploring how competitive pressures influence digital transformation and the consequential impact on financial resilience, mediated by R&D. It provides crucial insights for banks aiming to enhance competitiveness through strategic digital innovations, thereby improving financial stability and aligning with evolving market trends. The findings are pivotal for guiding decision-making among banking executives, fostering increased investment in R&D, and informing regulatory frameworks to support innovation while ensuring financial

stability and consumer protection. Overall, this research offers a comprehensive roadmap for banks to navigate the dynamic landscape of digital transformation effectively, ensuring long-term sustainability and competitive advantage in the marketplace.

This study is especially important in light of the rapidly changing banking industry today, which is being affected by the convergence of client expectations, growing competitive pressures, and technology improvements. Digital transformation is becoming a need rather than an option for banks, and they must act quickly to stay relevant and competitive. The report addresses a fundamental requirement for banks to effectively navigate these factors by looking at how competitive pressures influence digital transformation and its effects on financial resilience. The study offers insightful information about how banks may take use of digital advancements to prosper in a market that is becoming more and more unstable.

2. Literature Review

In the literature on organizational theory, the concept of resilience is examined within the contexts of crisis management, disaster management, and high-reliability organizations (Weick, 1993; Weick, Paton and Johnson, 2001). McDonough defined financial resilience for the first time in 2003. According to him, resilience is the independent way to manage institutions' costs in response to the rapid inflation prevalent in the United States at that time. During the 2000s, financial resilience was initially investigated at the home level as a means of managing a family's financial crises. Businesses suffer financial losses as a result of financial fluctuations, shifts in commodity pricing, and economic crises. Consequently, the topic of firms' financial resilience gained significant attention., particularly in the aftermath of the 2008 economic crisis (Rezaei Soufi et al., 2021). The ability of a business to withstand financial shocks, bounce back from setbacks, and sustain financial stability over time is referred to as financial

resilience (Daadmehr, 2024; Palmer, 2024). Research in financial resilience shows more focus is highlighted on organizational resilience (Pal, Torstensson, and Mattila, 2014; MacKinnon and Derickson, 2013). The financial world is full of uncertainties from pandemics to economic shifts. Traditional reactive approaches are no longer enough. Financial institutions need to be proactive in building resilience to adapt and survive these challenges. This includes identifying critical services, having backup plans, and fostering a culture of learning from incidents (Singh, 2024).

Digital Transformation

According to Shashikala (2019) even before transformation started, banks and markets had become more integrated, with a larger percentage of intermediary activities becoming market-based. Banking is changing from being based on physical branches to using information technology (IT) and big data, along with highly specialized human capital. In their main businesses, which include payment and consulting services, banks are up against more and more digital intermediaries. With the growth of the FinTech industry, which is defined as the application of advanced information and automation technology in the financial services industry where a shift in the application of technology in the creation of new services and business models has been taking place.

In response to the imposed Basel III regulatory norms, banks are pursuing new technological standards such as RegTech, or regulatory technology, which could ease the shift to digital banking. RegTech is a new wave of technology that considerably aids banks in their regulatory management process by utilizing digital advances and information technology. RegTech should be incorporated into a management function's (like a treasury's) digital transformation strategy. If the digital platform is adopted in an integrated manner, it can be used to assist the treasury's improved regulatory procedures as well as its strategic management initiatives. Commercial and prudential goals are aligned with this

arrangement (Von Solms, 2020).

Digital transformation changes businesses into technology firms and modifies the environment for customer interaction, marketing, and sales. To stay at the top of the industry, new digital solutions are needed due to the market's acceleration of change. Businesses who are embarking on a digital journey must understand that digital is more than just putting new technologies into use. Rather, to effectively compete both today and in the future, businesses of all sizes and industries must adopt a corporate mentality shift toward digital (Kane et al., 2015). Accelerated digitization might provide millions of dollars to economic growth, more foreign investment, and enhanced global competitiveness in tandem with the transformation of business models (Yanovska et al., 2019). Digital transformation aims to establish new manufacturing methods, products, and markets, giving organizations a competitive advantage (Shannak, 2012). FinTechs are reshaping essential banking functions such as capital allocation, risk sharing, clearing and settling payments, and executing maturity reforms. Additionally, they have established a new paradigm in which innovation is meaningfully fueled by information technology (Moro-Visconti et al., 2020). As the business landscape changes, digitization is becoming a necessity rather than a choice. Waiting too long can lead to marginalization for businesses. While there is no denying the advantages of the digital transition, academics are also aware of its difficulties. The difficulties banks confront in matching IT capabilities to business strategy are outlined by researchers who also stress the importance of organizational agility (Agarwal & Sambamurthy, 2020). According to Familoni and Shoetan (2024), cybersecurity concerns provide a significant obstacle that necessitates banks to invest in strong security measures to protect critical financial information

Digital transformation, also known as digital entrepreneurship, is sometimes misinterpreted as just using cutting-edge communication technology.

When investing in technology, it's important to consider the impact on organizational culture, institutional transformation, and regulatory frameworks. Digital change is not straightforward, certain, or predictable. Furthermore, it may have a disruptive or revolutionary impact on organizational outcomes, including technical capabilities and behaviors (Krasonikolakis et al., 2020).

Businesses and how they operate are changing due to the growing usage of integrating digital technologies (social media, mobile applications, corporate analytics, and cloud-based services). The level of digital maturity determines the extent of changes. By focusing on resolving specific business issues with individual and digital technologies, less developed digital enterprises have fewer options. The most advanced digital enterprises create sophisticated innovations based on digital strategies to revolutionize their industry (Kane et al., 2015). Because of technological advancements, people's daily lives are rapidly changing as a result of digitalization. Adopting digital transformation has resulted in changes to human management, employment procedures, and organizational design. The banking sector is not an exception to how the digital revolution is changing business (Carbó-Valverde, 2017).

Digital Transformation & Financial Resilience

The bank will benefit from digital transformation in two ways: on the one hand, it will grow output (client base) and, on the other hand, it will lower input costs (fewer staff members and faster transaction times). As a result, it seems reasonable that the digital revolution will improve bank performance (Doan et al., 2022). Banks' digital transformation leads to increased performance, which strengthens their financial resilience. Banks' revenue and profit margins increase as they increase revenue and use digital platforms to grow their customer base and streamline operations. Banks can more efficiently distribute resources because of the automation and efficiency advances that lower operating expenses. Commercial banks' cost and revenue profitability are impacted by

digital transformation. Digital transformation can lower commercial banks' operating expenses, increasing their profitability. First, internet mobile banking was established by commercial banks. Commercial banks can increase their profitability by constructing an integrated financial services platform (Huang, 2023). Businesses can become more resilient by reducing their financial restrictions through digital transformation. The most important resource for an organization's output, operations, and resilience to shocks and unfavorable occurrences is capital. The ability to finance an organization is essential to its long-term survival and growth. The greater an organization's financing channels, the lower its financing threshold, the more flexible it is to fully utilize its current resources and competencies, and the more likely it is to seize new market possibilities. More coping mechanisms enable businesses to quickly recover from a crisis, carry out efficient production and investment with their current resources, and endure the negative effects of external shocks (Wang et al., 2024). Also, digital transformation makes it possible for businesses to become better coordinated and interconnected. Limited resources and resource restrictions are major factors in the development of organizational resilience (Williams et al., 2017). This link between organizational resilience and digital transformation is well-established, with strategic technology investments playing a crucial role in navigating crises and empowering employees to adapt (He et al., 2022).

The enterprise's capacity to recognize, integrate, coordinate, and reconstruct itself is enhanced by its digital transformation (Zhang et al., 2021). In the finance industry, a robust strategy prepares the company for major obstacles and opens up new avenues for advancement (Vogus and Sutcliffe, 2007). Businesses that can adapt to changes and maintain their resilience in the financial sector will gain a competitive edge. Opportunities like these frequently lead to evolution throughout the environment (Lengnick-Hall et al., 2011). Digital transformation fuels organizational resilience through both established and

groundbreaking innovation (Zhang et al., 2021). It's important to recognize that employee well-being and resilience are also essential ingredients for a successful digital transformation journey (Trenerry et al., 2021).

H_1: Digital transformation enhances the financial resilience.

Digital Transformation, Competitor Pressure & Financial Resilience

Competitor pressure forces businesses to make decisions and react more quickly, which encourages them to innovate and create new strategies that increase their resilience (Cavaco & Machado, 2015). Businesses can get a competitive edge by implementing innovative digital marketing technology like AI, machine learning, and big data analytics, these technologies empower businesses to make better decisions, develop strong digital marketing strategies, and improve consumer experiences. The digital transformation is necessary for sustaining competitiveness in a dynamic market environment (Hussain et al., 2023).

Digital transformation goes beyond technology transfer; it's a substantial way to Managerial responsibilities include improving corporate efficiency, human resources, and process redesign. Digital transformation enables innovative techniques, value generation, and new business models. Bank competition's impact on financial stability has been a topic of educational and policy debate for the past 20 years, especially after the 2007-2008 global financial crises. Digital banking can improve efficiency and service by addressing information asymmetries using big data, AI/ML, and blockchain technology. It also offers a more user-friendly interface and higher standards of quality (Vives, 2019). Digital banking methods enable banks to improve their ability to beat competitors, reduce their risk aversion, and better manage risk in the event that it occurs, all while adequately responding to their clients' needs and responding to market developments (Ahmed, 2010). The "competition-stability" perspective suggests a favorable correlation between competition and financial stability. Improving competitiveness can reduce the risk of bankruptcies, as insufficient

competition can worsen bank instability (Stiglitz & Weiss, 1981). China's banking system has an optimal amount of competition. The 2015 stock market fall had no substantial impact on banks' Z-scores, although it did show an increase in non-performing loans (Hou, 2021).

DFI denotes financial services that are carried out remotely in a cashless manner using different electronic devices from which both parties (e.g., providers and receivers) gain benefits (Klapper 2017). Considering the undeniable importance and the prospects of DFI, banks of emerging Asian countries are on their way to implementing digital financial services (DFS) (e.g., FinTech, E-wallet, and other cashless transactions) in a full-fledged manner, although many banks from different countries have already minimally launched DFS and others are paving the way to doing so. This is because wider inclusion of easily accessible financial services helps banks attain stability (Ahamed and Mallick 2019), ke the global banking sector, banks in emerging Asian countries are also considering including DFS as they ensure banking stability, which sends out a message about the economic stability of any country and will consequently lead towards achieving the sustainable development goals (SDGs) by 2030 (Banna & Alam, 2021).

However, consistent with banking theories that argue that competition may lower the availability of credit to informationally opaque firms, it also discovers that asymmetric information limits the overall positive effect of bank rivalry on firm formation. Indeed, bank competition is less conducive to the establishment of new enterprises in industrial areas where informational asymmetries are more prevalent, and in extreme circumstances has a negative impact (Di Patti & Dell'Ariccia, 2004).

H_2: Competitor pressure has a moderating effect on the relationship between digital transformation and financial resilience.

Digital Transformation, Research and Development & Financial Resilience

The ultimate goal of digital transformation is to change the existing situation and to create new production processes, new products, and new markets. Digital transformation provides the organization with competitive advantages (Shannak, 2012). Product creation and innovation flexibility can provide a competitive advantage, create new value, and open up new markets (Almaazmi et al., 2020). In addition to increasing market diversity, competitiveness, efficiency, and inclusivity, innovative advancements can also lead to a concentration of markets. Innovation has expanded reach and sparked competition, particularly in emerging markets. However, a concentration of both new and old financial service providers may result from the economics of intermediation coupled with emerging technologies. (Khalatur et al., 2022)

The secret to long-term production and social welfare is R&D. Furthermore, it improved organizations' capacity. To enhance their competitiveness in the constantly evolving market, companies must allocate resources towards research and development. R&D enhances the organization's efficiency, productivity, and other areas. Businesses who invested more in R&D had more chances to increase their profits (Fatima et al., 2018). In the past, scholars have examined the connection between a company's performance and its R&D spending.

Gupta (2020) discover that during the recession, innovative businesses fared better than their non-innovative rivals. Innovative firms are resilient because they differentiate their products rather than using process innovation to reduce manufacturing costs and increase sales. Last but not least, creative businesses typically produce a greater variety of goods. Their varied range of technologies may shield them against shocks unique to individual products. Being innovative still plays a critical role in a firm's ability to invest in product differentiation and grow significantly more during a recession, even after taking

these alternative ideas into consideration. According to recent research by Bloom et al. (2018), businesses can successfully compete against a rise in low-cost import competition by upgrading their products and utilizing cutting-edge technology. Herb et al., (2025) investigated the implications of R&D costs that cannot be met. Different elements such as good data, production processes, and policies have historically provided an average return on R&D investment, and this has changed throughout time. The production methodologies can show whether a firm's R&D expenditure is good or harmful. It demonstrates that investments in R&D have a detrimental influence on corporate performance. It provides a low or high return to companies.

Lin, Lee and Hung (2006) explored the relationship between the intensity of R&D and the Tobin'Q level, and found that enterprises operating in higher sectors are unimportant, but more R&D increases the odds of gaining a competitive edge. also has a considerable effect on Tobin's Q measurements of shareholder value, although also reduces variability. It is carried out in several European financial markets as indicated by distinct aspects of R&D, such as France, Germany, and the United Kingdom, however the expense of R&D has a negative impact on the functioning companies.

R&D is critical to long-term production and societal wellbeing. Furthermore, it improved organizational capabilities. Organizations must engage in R&D operations to remain competitive in today's changing market. R&D helps organizations improve in areas such as production, technology, and efficiency. Firms with more R&D investment had more potential to earn profits (Fatima et al., 2018).

H_3: There is a significant relationship between digital transformation and research & development.

H_4: Research & development increases the financial resilience.

H_5: Research & development has a mediating effect on the relationship between digital transformation and financial resilience.

3. Methodology

This study's population comprised of Pakistan's banking industry and elements of the study are all the bank branches within the geographical limits of Rawalpindi & Islamabad. The Bank branches were the key element for interacting with employees so it can provide valuable responses for this study. The data was collected using non probability purposive sampling technique To determine the sample size, we applied the sample-to-item ratio based on the number of items in the study. The minimum recommended ratio is five to one (Gorsuch, 1983; Hatcher, 1994). Since our study's five variables include a total of 37 items, we calculated the sample size as 304 by multiplying 37 by 8.

Data collection involved distributing a structured questionnaire among bank employees. This was done by sharing the questionnaire link with friends and family members working in banks. Additionally, some data was gathered through in-person visits to bank branches, where employees were asked to complete the questionnaires. Data analysis is crucial for extracting insights from the collected data. The data analysis was done through SPSS by running different tests which include correlation analysis, regression, mediation and moderation analysis. This was done to examine the variable influence on each other.

Measurement of Variables

The study measures key variables using established scales from prior research. Digital transformation is assessed through 10 items adopted from He et al. (2022), while competitor pressure is measured using 7 items based on Dorson et al. (2018). R&D is evaluated with 11 items from Uzkurt et al. (2013), and financial

resilience is captured using 9 items adapted from Hussain and Papastathopoulos (2022).

4. Result

This chapter's goal is to provide the study's comprehensive conclusions, which centered on examining the complex connections among financial resilience, competition pressure, research & development, and digital transformation. Information is presented in a clear and logical flow thanks to the results' methodical organization following the study's hypotheses. An examination of the demographic data opens the chapter, providing information about the traits of the study's sample population. The degree and direction of the associations between the variables are next investigated through a correlation analysis. The chapter then explores the main conclusions, such as the moderation analysis, which evaluates how competition pressure affects digital transformation, and the mediation analysis, which looks into whether R&D acts as a mediator between digital transformation and financial resilience.

Table 1

Demographic Analysis

	Category	**Details**	**Frequency**	**Percentiles**
1	Gender	Male	180	59.2
		Female	124	40.8
		l		
2	Age	25-30	130	42.8
		30-35	93	30.6
		35-40	49	16.1
		40-45	26	8.6
		45 to above	6	2.0
3	Education	Graduate	101	33.2
		Postgraduate	191	62.8
		Doctorate	6	2.0
		Post Doctorate	6	2.0
4		**Total**	**304**	**100**

This table presents a demographic section of questionnaire. The demographics of respondent who have participated in this research have analyzed. The results

for each of the factor are follow as. Starting with gender, 180 males (59.2%) AND 124 females (40.8%) were present. In terms of age distribution, 130 (42.8%) participants were aged 25 to 30 years. With regard to education, 101 (33.2) have done graduation, 191(62.8) were post graduates,6 (2%) held a doctorate and post doctorate degree. The gender distribution in the sample was balanced, with a higher percentage of men (59.2%). Young individuals between the ages of 25 and 30 made up the majority of participants (42.8%) and 30-35 (30.6%), suggesting a comparatively young demographic. Regarding educational background, 62.8 percent of participants were postgraduate, and 33.2% of them were graduate students. A modest proportion of participants held post-PhD (2.0%) and doctorate (2.0%) degrees, indicating that the sample as a whole was highly educated.

Table 2

Correlation Analysis & Reliability Statistic

	Variables	DT	CP	FR	R&D	**No. of items**	**Cronbach's Alpha**
1	DT	1				10	.807
2	CP	.367**	1			7	.745
3	FR	.984	.399	1		9	.831
4	R&D	.102	.250**	.016	1	11	.776

Correlation is significant at the 0.01 level (2-tailed). Here DT= Digital Transformation, CP= Competitor Pressure, FR=Financial Resilience, R&D= Research & Development

The results accessed that there is a moderate positive relationship between digital transformation and competitor pressure (r=.367, p<.01). This suggests that with the increase in competitor pressure, companies are more likely to invest in digital transformation. There exist a strong and positive correlation between digital transformation and financial resilience, (r=.984, p<.01). Financial resilience and digital transformation are highly correlated because digital transformation enhances operational efficiency, adaptability, and customer engagement, which directly strengthen an organization's ability to withstand economic shocks and maintain financial stability. This concludes that firms with high digital transformation are financially resilient. A weak and positive correlation was observed between digital transformation and research & development (r= .102, p= .092.) This suggests that research & development activities don't strongly affect digital transformation. A positive and moderate correlation was observed between CP and FR which was (r=.399, p<.01) and a weak but significant correlation was observed between R&D and CP(r=.250, p<.01). Lastly, the correlation observed between R&D and FR was not significant.

The Cronbach's alpha for DT is .807 which shows the high value of the reliability of the variable and above the required value which is .7 meaning that the 10 items measure the idea of digital transformation consistently. With that following CP which is.745, FR .831and R&D is .776. The Cronbach's alpha for all variables is higher than the accepted cut-off point demonstrating the strong internal consistency between the items of variables.

Table 3

Mediation Analysis

	Path	B	SE	LLC	ULC	Status
H_1	DT→FR	1.076	.010	1.057	1.095	Accepted
H_2	DT-→ R&D	.115	0.65	-.013	.242	Rejected
H_3	R&D→ FR	-.082	.009	-.099	-.064	Accepted
H_4	DT→R&D→ FR	-.009	.006	-.021	.001	Rejected

The study accessed the mediating role of research & development on the relationship between digital transformation and financial resilience. The results revealed that the effect of digital transformation on financial resilience is positive and significant (*b*=1.076, se.010). The 95% confidence interval ranges from 1.057 to 1.095 revealing that the relation between the two of them is positive and significant. So, H_1 (Digital transformation enhances financial resilience.) is accepted. The the relationship between digital transformation and research & development is insignificant (*b*= .115, se=0.646), the confidence interval ranging from -.013 to .242 depicting that the association between these two variables is not significant as there exists a 0 between them. So, H_2 (There is a significant relationship between digital transformation and research & development.) is rejected. The direct path between research & development and financial resilience is statistically significant (*b*=-.082, *se*= .009). The interval of confidence ranging from .099 to -.064 as both values move in a negative direction indicates that an increase in financial resilience is associated with decreased financial resilience. So, H_4 (Research & development increases financial resilience) is rejected. Further, the indirect impact of research & development on relationship between digital transformation and financial resilience is not significant (*b*=-.009, *se*= .006) rejecting H_5 i.e., R&D has a mediating effect on the relationship between digital transformation and financial resilience.

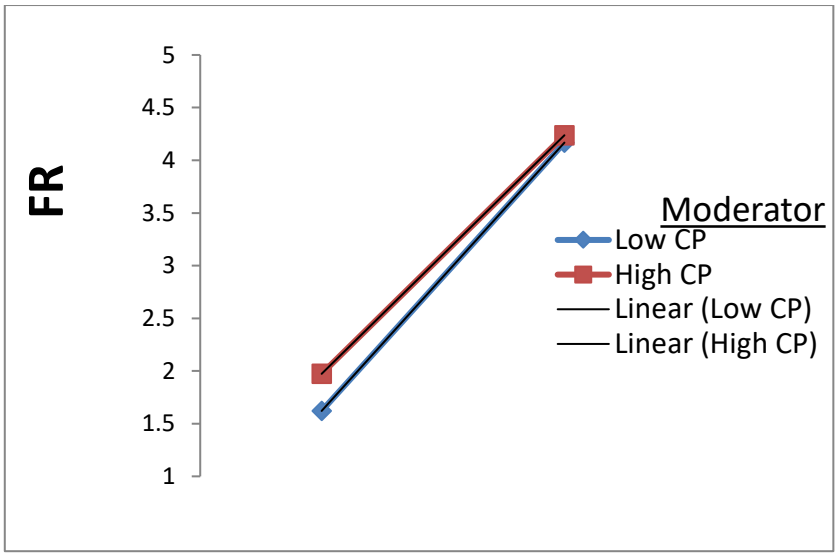
Table 4

Moderation Analysis

	Path	B	SE	T	P	LLC	ULC
H_5	DT→FR	1.203	.045	26.752	.000	1.115	1.292
	CP→FR	.106	.045	2.371	.018	.018	.193
	Int-1	-.071	.024	-2.902	.004	-.118	-.023

The table presents the results for the moderation analysis. The analysis examines whether the relationship between digital transformation and financial resilience is moderated by competitor pressure. The results demonstrated a significant direct effect between digital transformation and financial resilience (*b*=1.203, *se*, 0.450, *t*=26.752, *p*<.0001). The 95% confidence interval ranges from 1.115 to 1.292 depicting a significant positive relationship between these two variables. Similarly, a positive significant relationship is observed between competitor pressure and financial resilience (*b*=.106, *se*. .045, *t*=2.371, *p*= .018). The 95% confidence interval ranges from .018 to .193.

Primarily, the results revealed a significant interaction term between digital transformation and competitor pressure (*b*= -.071, *se*=.024, *t*= -2.902, *p*= .004). The confidence interval ranges from -.118 to -.022 depicting that moderation exists between digital transformation and financial resilience. Although the moderation effect is there but it weakens the relationship between digital transformation and financial resilience. As the competitor pressure increases, the positive impact of digital transformation and financial resilience decreases.



As discussed above, CP pressure dampens the positive relationship between DT and FR. Also, a simple slope analysis is conducted to better understand the moderating effect of CP. As we can see in Figure 4.1 at highly competitive pressure (CP) the line is much stronger and steeper between digital transformation and financial resilience (FR). At low CP, the line is weaker than at high CP, which shows that when competitive pressure increases, the relationship between DT and FR decreases and vice versa.

5. Discussion

According to Huang (2023) digital transformation can assist in reducing operating costs for banks. Banks' expenses and earnings are similarly impacted by digital change. Similarly Khin and Ho (2019), the study's findings regarding the mediating effect of digital innovation suggest that companies that are dedicated to adopting digital technologies and strengthening their capacity to do so will be more likely to create creative digital solutions, which will enhance organizational performance. This leads to the division of digital transformation in this paper into two categories: technology-based digital transformation, which employs digital technologies to improve on existing business processes, and market-based digital transformation, which aims to apply digital technologies to support business model innovation and seize new market opportunities (Verhoef

et al., 2021). While digital transformation has been shown to improve bank performance primarily through cost reduction and increased customer reach it has also forced commercial banks to either explore non-traditional income streams to maintain their income levels or adopt cutting-edge technologies to compete with Fintechs (Begenau et al., 2018; Fuster et al. 2019).

The hypotheses are about the meditation role of research & development in the relationship between digital transformation and financial resilience. Among these three, let us discuss the first direct hypothesis indicating the significant relationship between digital transformation and financial resilience. However, the results revealed that there is an insignificant relationship between digital transformation and research & development. This contradicts the previous literature which discovered the positive relationship between digital transformation and research & development. As per Wang & Chen (2022), the level of R&D spending often impacts the efficacy of digital transformation initiatives. Banks that prioritize R&D can better navigate the challenges of digitization, increasing overall resilience and competitiveness R&D is critical for fostering digital transformation by creating novel financial technology and digital solutions. Banks, for example, spend in R&D to develop new digital banking products and services, thereby improving their market position and operational capabilities.

However, an insignificant relationship has been observed in this study which attributed to various explanations. In accordance with Raj et al., (2020), he discussed the negative effect of digital transformation in his research indicating that, digital transformation could be advantageous, it may also have negative consequences that outweigh the good. As, it can cause significant changes to company systems, increasing operational and information security risks and negatively impacting core business. This study examines the nature and implications of digital transformation, stressing how digital technology can cause

disruptions in many areas including competitive landscape and data with both positive and bad outcomes. The study implies that controlling structural changes and organizational obstacles is crucial to limiting the negative impacts on sectors like R&D (Vial, 2019).

This study explores the obstacles for R&D, mainly due to businesses repositioning themselves from traditional to digitally transformed, primarily for organizations that lack digital transformation. This may cause the need for quick digitalization, leading to distraction from traditional R&D efforts, which lead to a decrease in innovation and revolution (Shashikala (2019). One of the reasons for this insignificant relationship could be the maturity of initiatives taken for digital transformation, organizations in the early ages of digitalization might not accessed the considerable impact of research & development activities. As Nambisan et al., (2017) discussed in the study stating that, organizations with higher levels of digital maturity can operationalize digital transformation initiatives.

The study accessed the significant relationship between research & development and financial resilience. In any organization, R&D activities are responsible for innovation, competitive advantage eventually leads to financial resilience. However, the present study found a significant but negative relationship between R&D and FR depicting that higher investment in R&D activities causes a decrease in FR. So, this suggests that a heavy investment in R&D activities might burden the organization's financial resources, mainly in the short run. Organizations with low digital maturity might discover it as a risky investment. The study done by Lantz and Sahut (2005) showed a negative effect of R&D investment on financial performance stating that an increase in R&D causes a decrease in financial performance in terms of net income, and growth and it is riskier as these investments take longer to materialize. Firms with intensive R&D investments can increase their distress risk. Unlike capital

investment, R&D investments tend to be more inflexible and associated with high operational costs which eventually leads to financial burdens (Reilly & Damodaran, 1995). Contrary to the hypothesis and with the evidence of the above discussion, R&D does not mediate the relationship between DT and FR.

6. Conclusion

The conclusion chapter of this study will underscores on the main outcome, how this research achieves its objectives, and answer the questions. This chapter will discuss the limitations experienced during this research, suggest possible recommendations for future studies, and highlight practical and theoretical implications for the readers. This will emphasize on overall significance of the study. This study focuses on the need for financial resilience highlighted by main events like global financial crises and pandemics. Also, these events led to a greater emphasis on digital transformation in the banking industry resulting in efficient risk management, greater efficiency, and improved customer experience. Competitor pressure motivates banks to implement new strategies, service improvements, and adoption of technologies to remain an industry leader. Coupled with research & development to create new innovative products and services to stay competitive.

Previous studies have found that a bank's digital transformation has increased its financial performance. Through digital transformation, banks have become more resilient as it decreases their financial restrictions. Also, in today's digital transformation is not a choice anymore it has become a necessity. As the competition in the banking industry is fierce, to remain competitive businesses need to invent technologies that complement their product and services. Contrary to these studies have predicted that R&D investment may cause a decline in financial performance as it is riskier and takes longer to convert into cash flows. Similarly, industries should be aware of their competitive landscapes and make decisions and strategies accordingly. Five hypotheses have been

formed based on the literature.

Digitally transformed banks are ahead of the ones that are not as they operationalize innovative strategies that improve their customer satisfaction and consequently enhance their financial resilience. Organizations in the early stages of digitalization are unable to examine the impact of R&D on DT and consider it as a financial constraint. It was found an insignificant relationship between DT, R&D, and FR so no mediation exists. However, a significant relationship was found between DT, CP, and FR which confirms the existence of moderation in the study.

Theoretical Implications

The study explores the literature by implementing resilience theory within the context of the banking industry. The results revealed the significant relationship between digital transformation and financial resilience which shows that banks that invest in digital technologies and efficiently implement them are more proficient in dealing with unforeseen events and financial challenges. This smoothly aligns with the resilience theory, which highlights the capacity of organizations to withstand and recover from the shock.

The significant and negative relationship between digital transformation, competitor pressure, and financial resilience exhibits that competitor pressure does play a moderating role but in a negative direction. High competitor pressure may worsen the effects of digital transformation associated with digital initiatives leading to a possible decrease in financial resilience. The finding reveals that the dynamic capabilities theory emphasizes that external pressure such as competitor pressure can exacerbate the organization's capacity to leverage digital transformation for financial resilience.

Practical Implications

The study examines that bank's upper management and decision-makers, banks need to invest in digital transformation as it enhances financial resilience. Banks

need to realize the importance of digital technologies that improve customer experience and greater risk management which enables them to better withstand the financial shock. However, in a highly competitive market, this should carefully overlook where the urge to innovate could lead to a decrease in financial resilience.

The findings contradict the previous research that an insignificant relationship exists between research & development, digital transformation, and financial resilience which shows that banks need to revise and improve their R&D strategies. Rather than concentrating only on internal R&D, banks could find it advantageous to investigate outside collaborations, purchase fintech technologies, or use regulatory technology (RegTech) to speed up digital transformation. This strategy may yield more timely and pertinent technologies that directly support financial resilience. While making new strategies for digital innovation, regulators and policymakers should consider these findings. They should encourage responsible innovation banks are not only adopting new technology for upgradation but doing so with the long-term goal which is to increase financial resilience given the potential dangers associated with competitor-driven digital transformation.

Limitations

The research is conducted in the banking sector, this may limit the implementation of findings to any other industry. In other sectors like manufacturing or retail, the dynamics of digital transformation and financial resilience might be affected differently. Because of geographical constraints, this study is conducted only in the premises of Islamabad and Rawalpindi which might also affect its generalizability. A cross-sectional design is used in the study to collect data at a certain moment in time. This makes it more difficult to determine the causes of the links that exist between competitive pressure, R&D, financial resilience, and digital transformation. Studies with a longer time span may offer more thorough insights into how these associations change over time.

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