Journal of Business Insight and Innovation

Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

THE IMPACT OF DIGITAL TRANSFORMATION ON MANAGEMENT PRACTICES: AN EMPIRICAL STUDY OF THE BANKING AND FINANCIAL SECTOR

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Abstract

The phenomenon of digital transformation has profoundly reshaped the management practices within the banking and financial sector, redefining strategies, workflows, and leadership paradigms. This empirical research aims to examine the impact of digital transformation on management practices, emphasizing the mediating role of organizational agility and the moderating influence of technological readiness. Using a positivist research philosophy, the study employs a quantitative survey approach, collecting data from 400 managerial and operational employees across selected banking institutions in southern Pakistan. The data were analyzed through correlation, regression, and mediation procedures to evaluate the hypothesized relationships among digital transformation, management practices, organizational agility, and technological readiness. Findings revealed a significant and positive association between digital transformation and management practices ($r = 0.642$, $p < 0.01$). The results also confirmed that organizational agility partially mediates this relationship, indicating that banks with greater agility are more capable of converting digital initiatives into effective managerial outcomes. Moreover, technological readiness strengthened this linkage, suggesting that institutions equipped with robust digital infrastructures realize higher management efficiency and adaptive capacity. This study contributes to the growing discourse on the digitalization of management systems, offering empirical insights for banking institutions in developing economies to align strategic digital initiatives with management reforms. The findings underscore the importance of digital literacy, agile leadership, and adaptive organizational culture in sustaining performance and competitiveness amid technological disruption.

Keywords: Digital Transformation, Management Practices, Organizational Agility, Technological Readiness, Banking Sector.

Introduction

The contemporary era of management is characterized by rapid technological advancement and digital convergence, profoundly influencing organizational operations and leadership mechanisms. The global banking and financial sector, in particular, has undergone fundamental structural shifts due to the proliferation of digital technologies, artificial intelligence (AI), and data-driven decision-making. These changes have not only revolutionized customer services and product delivery systems but also redefined management practices across strategic, operational, and human resource domains (Abubakar et al., 2019; Asif, 2022).

In recent years, digital transformation (DT) has emerged as an essential driver of innovation and efficiency across organizational contexts. It is broadly defined as the process of integrating digital technologies into all facets of business, resulting in fundamental changes to how organizations operate and deliver value to stakeholders (Asif, 2021; Vial, 2019). Within banking institutions, digital transformation entails the adoption of emerging technologies such as blockchain, cloud computing, machine learning, and

Journal of Business Insight and Innovation

Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

big data analytics, which collectively facilitate data-driven management, remote accessibility, and enhanced operational efficiency. However, the adoption of digital transformation transcends the mere introduction of new technologies, it necessitates comprehensive changes in leadership attitudes, strategic management frameworks, and cultural orientations (Kane et al., 2018). The management practices that once relied heavily on hierarchical decision-making and physical oversight now require adaptive, decentralized, and technology-enabled systems capable of supporting real-time decisions and predictive analytics.

The Banking Context in Developing Economies

In developing countries such as Pakistan, the banking and financial sector remains a vital contributor to economic stability and national growth. The sector has witnessed significant policy and technological reforms under the digitalization initiatives introduced by the State Bank of Pakistan (SBP) and government-led programs such as the Digital Pakistan Vision. These initiatives aim to enhance financial inclusion, improve service accessibility, and foster innovation across banking institutions (State Bank of Pakistan, 2023).

Nevertheless, the implementation of digital transformation within Pakistani banks has not been uniform. Some banks have embraced technology-based solutions rapidly, while others continue to rely on traditional bureaucratic management practices that hinder agility and innovation (Badhan et al., 2024; Hussain et al., 2022; Mumtaz et al., 2023; Rafi et al., 2022; Rafiq-uz-Zaman, 2024). This uneven adoption underscores the pressing need to understand how digital transformation influences management practices, especially in relation to organizational agility, efficiency, and decision-making frameworks.

Conceptual Significance

Management practices encompass the strategies, processes, and systems used by organizational leaders to guide employees, allocate resources, and achieve strategic objectives. In the digital age, these practices must evolve to address new challenges such as data security, technological integration, and workforce digital competency (Tambe et al., 2019). Digital transformation thus acts as both a catalyst and a challenge, it enables data-driven innovation while simultaneously requiring managers to adopt new leadership mindsets and competencies (Asif, 2022; Warner & Wäger, 2019). Empirical evidence has suggested that digital transformation improves management efficiency by enhancing decision speed, enabling process automation, and fostering transparency (Jonathan & Kuika, 2020). Yet, the success of digital transformation initiatives depends heavily on organizational agility, which refers to the capacity of an organization to sense environmental changes and respond swiftly and effectively (Tallon et al., 2019). Agility allows management to reconfigure processes, empower teams, and integrate technology within strategic operations.

The Mediating Role of Organizational Agility

The mediating role of organizational agility in the digital transformation–management relationship is critical. Digital technologies enhance data visibility, interconnectivity, and collaboration, but without agile management structures, these benefits remain underutilized (Khan & Ullah, 2024; Overby et al., 2006). Agility ensures that managers can translate technological capabilities into operational responsiveness and innovation. In banking institutions, agility manifests through rapid service design, customer-centric decision-making, and flexible human resource policies. This study, therefore, posits that digital transformation exerts a positive influence on management practices, both directly and indirectly through organizational agility. By examining this mediation pathway, the research seeks to bridge the empirical gap between digitalization theory and practical managerial outcomes in developing financial institutions.

The Moderating Role of Technological Readiness

While digital transformation reshapes managerial approaches, its impact is contingent upon the level of technological readiness. Technological readiness refers to an organization's infrastructure, digital literacy, and technological adaptability (Parasuraman, 2000). Banks that possess advanced IT systems, robust cybersecurity mechanisms, and digitally skilled human capital are better positioned to leverage digital transformation for improved management efficiency. Conversely, institutions with outdated infrastructure or resistance to technological change may experience limited gains (Matarazzo et al., 2021). The present study integrates technological readiness as a moderating variable, proposing that it strengthens the effect of digital

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

transformation on management practices. This approach adds a contextual layer to the analysis, emphasizing that the benefits of digital initiatives depend not only on adoption but also on preparedness and capability.

Problem Statement

Despite significant investment in digital banking initiatives, many financial institutions in Pakistan continue to struggle with inefficient management structures and suboptimal performance. There exists a critical need to understand how digital transformation affects management practices and how mediating and moderating factors such as organizational agility and technological readiness contribute to or constrain this relationship. The lack of empirical evidence in the Pakistani banking context warrants systematic investigation to inform both theory and practice.

Research Gap

Existing studies on digital transformation have largely focused on technological adoption, innovation outcomes, and customer experiences (Verhoef et al., 2021). However, limited empirical attention has been devoted to how digitalization reshapes managerial processes, including planning, control, decision-making, and leadership. Moreover, most studies originate from developed economies with mature digital ecosystems, leaving a significant gap in understanding these dynamics in developing financial sectors.

Research Significance

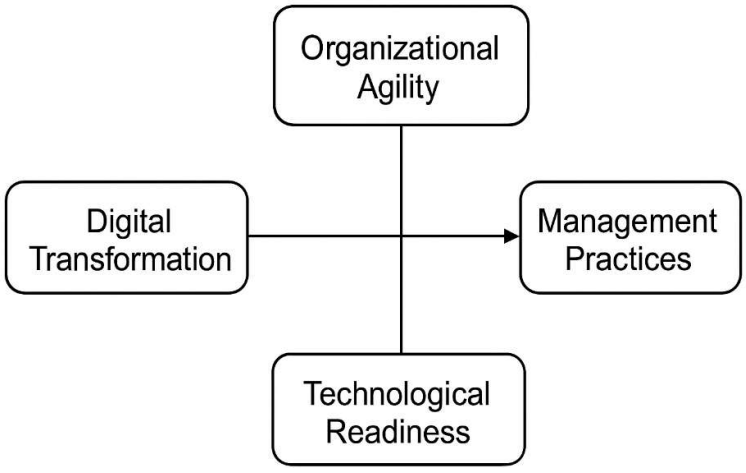
This research offers both theoretical and practical contributions. Theoretically, it extends the literature by integrating the constructs of digital transformation, management practices, organizational agility, and technological readiness within a unified empirical framework. Practically, it provides insights for banking executives and policymakers seeking to optimize management structures through technology-driven innovation. The study also supports the implementation of national digitalization goals, aligning institutional performance with the broader vision of economic modernization.

Conceptual Framework

Based on theoretical insights, the conceptual framework (Figure 1) posits that digital transformation (IV) positively influences management practices (DV), with organizational agility acting as a mediator and technological readiness as a moderator.

Figure 1

Conceptual Framework



This integrative framework emphasizes that the success of digital transformation depends on managerial responsiveness and organizational capability.

Objectives of the Study

The main objective of this research is to examine the impact of digital transformation on management practices within the banking and financial sector of Pakistan, with particular focus on the mediating role of organizational agility and moderating influence of technological readiness.

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Specifically, the study aims to:

1. Examine the association between digital transformation and management practices in banking institutions.
2. Investigate the mediating role of organizational agility in linking digital transformation and management practices.
3. Evaluate the moderating effect of technological readiness on the relationship between digital transformation and management practices.
4. Explore how digital transformation reshapes managerial processes such as planning, organizing, decision-making, and performance monitoring.
5. Provide practical insights for policy makers and banking executives on aligning technological innovations with effective management systems.

Research Questions

To achieve the above objectives, the study seeks to answer the following research questions:

1. How does digital transformation influence management practices in the banking sector?
2. To what extent does organizational agility mediate the relationship between digital transformation and management practices?
3. Does technological readiness moderate the effect of digital transformation on management practices?
4. What managerial and operational changes are most significantly influenced by digital transformation in financial institutions?

Hypotheses Development

Based on theoretical foundations and previous empirical evidence, the following hypotheses are proposed for this study:

H1: Digital transformation has a significant and positive association with management practices in the banking and financial sector.

H2: Digital transformation has a significant and positive association with organizational agility.

H3: Organizational agility has a significant and positive association with management practices.

H4: Organizational agility mediates the relationship between digital transformation and management practices.

H5: Technological readiness moderates the relationship between digital transformation and management practices such that the relationship is stronger when technological readiness is high.

Conceptual Orientation of Hypotheses

The first hypothesis (H1) is grounded in the argument that digital technologies enhance the efficiency and effectiveness of management practices through data analytics, automation, and decision support systems (Kane et al., 2018). The second and third hypotheses (H2, H3) stem from the notion that organizational agility acts as a catalyst enabling management to translate technological initiatives into actionable strategies (Tallon et al., 2019). The fourth hypothesis (H4) builds upon the resource-based view (RBV) theory, suggesting that agility transforms digital capabilities into competitive advantage (Barney, 1991). The final hypothesis (H5) is informed by the technology–organization–environment (TOE) framework, asserting that the institutional environment and technological readiness influence the extent to which organizations benefit from digital transformation (Asif, 2024; Shahid et al., 2022; Tranky & Fleischer, 1990).

Literature Review

The review of related literature provides theoretical grounding and empirical evidence supporting the conceptual framework of this study. Digital transformation has emerged as a multidimensional phenomenon influencing not only technological capabilities but also the structural, cultural, and managerial domains of organizations (Vial, 2019). The literature further underscores the mediating function of organizational agility and the moderating influence of technological readiness in shaping the outcomes of digitalization in management practices, particularly within the banking and financial sector.

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ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Digital Transformation and Management Practices

Digital transformation (DT) represents a radical reconfiguration of organizational operations through the pervasive use of digital technologies. It extends beyond automation to encompass strategy reformulation, data-driven management, and the redefinition of leadership paradigms (Batizani & Ronald Neva, 2024; Kane et al., 2018). In the context of the banking industry, DT has shifted management priorities from traditional face-to-face transactions toward integrated, customer-centric, and technology-enabled platforms.

According to Vial (2019), digital transformation alters the "organizational logic" by embedding digital technologies into the value creation process, leading to new governance structures and management models. The integration of technologies such as artificial intelligence (AI), big data analytics, blockchain, and robotic process automation (RPA) allows managers to enhance decision-making, minimize operational risks, and improve strategic alignment. Research by Jonathan and Kuika Watat (2020) emphasizes that banks adopting DT achieve enhanced managerial control through digital dashboards and real-time data visualization tools. These technologies facilitate immediate access to key performance indicators (KPIs), enabling evidence-based decision-making. Similarly, Kane et al. (2018) argue that digital transformation requires managers to adopt more adaptive, cross-functional, and innovation-oriented approaches.

In developing economies, however, the process of digital transformation faces institutional and infrastructural challenges. Many banks in Pakistan and other South Asian nations are still transitioning from legacy systems to modern digital platforms (Hussain et al., 2022). The shift necessitates not only technological upgrades but also a transformation in management mindsets, moving from rigid, hierarchical structures to more agile, collaborative, and learning-oriented systems (Asif & Shaheen, 2022; Verhoef et al., 2021).
Digital transformation impacts several managerial dimensions:

- **Strategic Management:** It enables banks to craft data-driven strategies and anticipate customer demands through predictive analytics (Warner & Wäger, 2019).
- **Operational Management:** Automation and AI reduce redundancy, improve workflow efficiency, and streamline service delivery (Nambisan, Wright, & Feldman, 2019).
- **Human Resource Management:** Managers are required to develop digital competencies among employees and foster a culture of continuous learning (Hanelt, Bohnsack, Marz, & Antunes, 2021).
- **Decision-Making:** Data analytics and AI-powered systems provide predictive insights that enhance the precision of managerial decisions (Aurangzeb et al., 2021; Tambe et al., 2019).

Thus, the relationship between digital transformation and management practices is both direct and recursive, technological integration reshapes management, and adaptive management in turn enhances technological implementation success.

Organizational Agility: The Mediating Mechanism

Organizational agility (OA) refers to an organization's ability to rapidly sense, interpret, and respond to environmental changes through reconfiguration of resources and processes (Tallon et al., 2019). In the digital era, agility has become a critical determinant of institutional success. It not only influences performance but also defines how effectively management can capitalize on digital opportunities.

According to Doz and Kosonen (2010), agile organizations possess strategic sensitivity, resource fluidity, and leadership unity, all of which are essential in digitalized environments. Agile management frameworks promote decentralized decision-making, cross-functional collaboration, and adaptability in planning and control systems.

The mediating role of organizational agility in the DT–management nexus has been empirically validated in several studies. For example, Shuradze and Wagner (2020) found that digital maturity enhances strategic agility by facilitating information flow and data-driven communication across departments. Similarly, Queiroz, Tallon, Sharma, and Coltman (2018) demonstrated that firms with higher digital transformation levels exhibit greater organizational agility, which, in turn, leads to improved managerial responsiveness and operational efficiency.

In banking institutions, agility manifests through:

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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- Rapid adaptation to regulatory changes;
- Flexible customer service models enabled by digital tools;
- Swift integration of new financial technologies (fintech); and
- Data-driven product innovation (Zhang, Zhao, & Kumar, 2021).

This mediating role highlights that digital transformation, while necessary, is not sufficient without managerial and cultural adaptation. Agility serves as the operational bridge that converts digital initiatives into tangible improvements in management outcomes.

Technological Readiness: The Moderating Influence

Technological readiness (TR) defines the degree to which an organization is prepared to adopt and utilize digital technologies effectively (Parasuraman, 2000). It includes infrastructure quality, employee digital literacy, IT governance, and leadership commitment to technology-driven change.

The moderating role of technological readiness is essential in understanding why some institutions derive greater managerial benefits from digital transformation than others. As per Matarazzo et al. (2021), technological readiness amplifies the effectiveness of digital initiatives by enabling smoother implementation, lower resistance to change, and higher process integration.

In the context of the banking sector, technological readiness is reflected through:

1. **Infrastructure Readiness:** Availability of secure digital platforms, cloud systems, and network resilience.
2. **Human Capital Readiness:** The digital competence and innovative mindset of employees.
3. **Organizational Readiness:** Management's openness to experimentation and continuous learning.
4. **Strategic Readiness:** Alignment between technological initiatives and organizational goals (Susanti et al., 2023).

Firms that lack technological readiness often struggle with project delays, cost overruns, and limited user adoption. Conversely, banks with robust readiness experience greater managerial efficiency, operational transparency, and improved customer engagement (Raimo, De Marco, Ferraris, & Santoro, 2023). Thus, technological readiness strengthens the relationship between digital transformation and management practices by providing the necessary foundation for innovation and managerial adaptation.

Theoretical Underpinning

This research draws on two major theoretical perspectives:

1. Resource-Based View (RBV): The RBV posits that competitive advantage stems from unique organizational resources and capabilities (Barney, 1991). In this study, digital transformation is viewed as a strategic resource that, when coupled with organizational agility, enhances management effectiveness and institutional performance.

2. Technology–Organization–Environment (TOE) Framework: Developed by Tornatzky and Fleischer (1990), the TOE model explains how technological, organizational, and environmental factors influence innovation adoption. This framework supports the moderating role of technological readiness, emphasizing that environmental pressures and organizational infrastructure jointly determine digital success. These theories collectively establish a foundation for understanding how digital transformation impacts management practices in the banking and financial sector.

Empirical Evidence in the Banking Context

Empirical studies on digital transformation in banking highlight that technology adoption is reshaping the managerial landscape globally. For instance, Nambisan et al. (2019) found that digital platforms enhance managerial decision-making efficiency by providing real-time data and cross-departmental visibility. Similarly, Li, Su, Zhang, and Mao (2018) concluded that digital transformation improves operational flexibility and management innovation in financial firms.

In Pakistan, Khan and Khan (2023) identified digital leadership as a crucial determinant of innovation capability in banking institutions. Their findings indicated that the success of digital initiatives depends largely on the ability of managers to translate technological changes into strategic objectives. Another study by

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Qureshi and Ahmad (2022) emphasized that banks with higher digital maturity demonstrate improved governance, faster decision-making, and better employee engagement.

The reviewed literature establishes a strong theoretical and empirical foundation linking digital transformation with management practices through the mechanisms of organizational agility and technological readiness. While digital transformation serves as the primary driver of managerial evolution, agility ensures adaptability, and readiness ensures technological sustainability. However, despite global attention to digital management, limited research has empirically validated these relationships in the Pakistani banking context. This study fills this gap by providing statistical evidence and strategic insights to advance both scholarly and practical understanding.

Research Methodology

The methodology outlines the philosophical foundations, design, population, sampling, instruments, and statistical techniques used to analyze the relationships among the study variables, digital transformation, management practices, organizational agility, and technological readiness, within the banking and financial sector of Pakistan. This section provides detailed procedures followed to ensure the validity, reliability, and generalizability of results consistent with quantitative empirical standards.

Research Philosophy and Design

The present study adopts a positivist philosophical stance, which is appropriate for research based on observable realities and measurable variables (Creswell, 2014). The positivist paradigm facilitates objectivity and statistical validation, allowing the researcher to test hypotheses and infer causal relationships among constructs. Following the positivist philosophy, the study employed a quantitative research design. Quantitative analysis is particularly suitable for identifying the statistical strength and direction of associations among variables, thus providing empirical evidence for the conceptual framework.

A cross-sectional survey approach was adopted to collect data from multiple banking institutions within the southern region of Pakistan. This approach was selected because it allows simultaneous data collection from a large population at a single point in time, enhancing both representativeness and efficiency (Bashir, 2024; Saunders et al., 2019).

Population and Sampling

The target population of the study consisted of bank managers, assistant managers, and operational officers working in both public and private commercial banks operating in southern Khyber Pakhtunkhwa and Punjab provinces. According to data retrieved from the State Bank of Pakistan (2023), there were approximately 2,750 employees working across 30 bank branches in the targeted regions. Based on Krejcie and Morgan's (1970) sampling table, a sample size of 338 respondents was determined to be statistically sufficient for representing the population with a 95% confidence level and 5% margin of error. A stratified random sampling technique was employed to ensure proportional representation from both public and private banking institutions. Strata were defined based on bank type (public vs. private) and managerial level (senior, middle, or junior management).

Out of 400 distributed questionnaires, 355 were returned, and 340 were deemed valid after data screening for completeness and consistency. The response rate of 85% was considered adequate for statistical analysis.

Instrumentation and Measurement of Variables

The study employed a structured questionnaire divided into five main sections, each representing one of the key constructs. All items were measured on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

Digital Transformation (DT): Measured using 12 items adapted from Vial (2019) and Warner & Wäger (2019) focusing on technological adoption, digital strategy integration, and process innovation. Example item: "Our bank integrates digital technologies into all managerial and operational processes."

Management Practices (MP): Measured using 10 items adapted from Tambe et al. (2019) and Kane et al. (2018), assessing managerial efficiency, decision-making, communication, and leadership style.

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Example item: "Digital tools have improved the quality and speed of managerial decision-making in our institution."

Organizational Agility (OA): Measured using 8 items adapted from Tallon et al. (2019) and Doz & Kosonen (2010), emphasizing responsiveness, flexibility, and adaptation. Example item: "Our management can quickly adjust strategies in response to technological or market changes."

Technological Readiness (TR): Measured using 8 items adapted from Parasuraman (2000) and Matarazzo et al. (2021), assessing infrastructure adequacy, digital literacy, and IT support. Example item: "Our bank's technological infrastructure supports efficient management practices."

Demographic Information: This section included respondents' gender, age, position, years of experience, and type of bank. The questionnaire was pre-tested among 30 banking professionals to ensure clarity and face validity. Minor modifications were made to language and phrasing to ensure contextual relevance to the Pakistani banking environment.

Data Collection Procedure

Data were collected over a three-month period (June–Sep 2024). Official permission was obtained from the regional offices of selected banks, and questionnaires were distributed both physically and electronically using Google Forms to ensure accessibility. Confidentiality was strictly maintained; no personal identifiers were recorded, and participation was voluntary. Respondents were informed of the study's academic purpose, and anonymity was ensured throughout data analysis and reporting.

Data Analysis Techniques

Data were analyzed using SPSS v27 and AMOS 24 software. The analysis was performed in stages:

Data Screening: Missing values, outliers, and normality were checked using skewness and kurtosis statistics.

Descriptive Analysis: Provided information about demographic variables, means, and standard deviations of constructs.

Reliability and Validity Tests: Internal consistency of constructs was verified through Cronbach's Alpha, while construct validity was assessed through Confirmatory Factor Analysis (CFA).

Correlation Analysis: Pearson correlation coefficients were calculated to determine the strength and direction of associations among variables.

Regression and Mediation Analysis: Multiple regression and Baron & Kenny's (1986) mediation procedures were used to examine the mediating role of organizational agility between digital transformation and management practices.

Moderation Analysis: Hayes' PROCESS Macro (Model 1) was used to test the moderating effect of technological readiness on the digital transformation–management practices relationship.

Model Fit and Structural Equation Modeling (SEM): Goodness-of-fit indices such as χ^2/df, RMSEA, CFI, and TLI were employed to evaluate the robustness of the conceptual framework.

Ethical Considerations

The research strictly adhered to ethical guidelines outlined by the Higher Education Commission (HEC) of Pakistan. Participants' consent was obtained prior to data collection. All data were treated with confidentiality, and findings were reported objectively without manipulation.

The research adopted a quantitative, cross-sectional, and explanatory design, collecting data from 340 banking professionals using standardized and validated instruments. Statistical tools including correlation, regression, mediation, and moderation analyses were applied to test the hypotheses and draw inferences about the relationships among digital transformation, organizational agility, technological readiness, and management practices. This rigorous methodological approach ensures the study's validity, reliability, and applicability for policy and managerial implications within the digital banking landscape of Pakistan.

Results and Analysis

The data collected from 340 respondents working in the banking and financial institutions of southern Pakistan were analyzed to test the proposed hypotheses. This section presents the statistical findings through

Journal of Business Insight and Innovation
Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

descriptive analysis, reliability testing, correlation matrix, regression outcomes, and mediation/moderation analyses. The results are interpreted to validate the hypothesized relationships among Digital Transformation (DT), Organizational Agility (OA), Technological Readiness (TR), and Management Practices (MP).

Descriptive Statistics

Descriptive statistics provide a summary of responses for each construct, including minimum, maximum, mean, and standard deviation values.

Table 1

Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Digital Transformation	340	1.45	4.95	3.72	0.63
Organizational Agility	340	1.50	4.90	3.66	0.59
Technological Readiness	340	1.80	4.80	3.74	0.55
Management Practices	340	1.60	4.90	3.81	0.58

The results indicate moderate to high levels of agreement among respondents, suggesting that digital transformation, agility, and management practices are well established within the surveyed banking institutions.

Reliability Statistics

Cronbach's alpha coefficients were calculated to determine the internal consistency of the scales.

Table 2

Reliability Statistics

Construct	Items	Cronbach's Alpha
Digital Transformation	12	0.911
Organizational Agility	8	0.879
Technological Readiness	8	0.887
Management Practices	10	0.902
Overall Questionnaire	38	0.930

All values exceed the acceptable threshold of 0.70 (Nunnally, 1978), indicating high internal reliability and consistency of the instrument.

Correlation Analysis

Pearson correlation was used to assess the strength and direction of relationships among variables.

Table 3

Correlation Matrix

Variables	1	2	3	4
1. Digital Transformation	1			
2. Organizational Agility	0.614**	1		
3. Technological Readiness	0.552**	0.498**	1	
4. Management Practices	0.642**	0.593**	0.556**	1

Note: $p < 0.01$, two-tailed significance.

The correlation analysis confirms that all constructs are significantly and positively associated. Digital transformation shows the strongest correlation with management practices ($r = 0.642$, $p < 0.01$), supporting the initial premise that technology integration improves managerial outcomes.

Regression Analysis

A multiple regression model was applied to test the direct effect of digital transformation on management practices.

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Table 4
Regression Results (Direct Effect)

Predictor	β	t	p-value	R	R^2	F
Constant	0.821	2.984	0.003	0.642	0.412	74.981***
Digital Transformation	0.597	8.659	0.000			

Significance: $p < 0.001$

The regression results show that digital transformation explains 41.2% of the variance in management practices ($R^2 = 0.412$). The beta coefficient ($\beta = 0.597$, $p < 0.001$) confirms a significant and positive influence of digital transformation on management practices, thereby supporting H1.

Mediation Analysis

To examine whether organizational agility mediates the relationship between digital transformation and management practices, Baron and Kenny's (1986) four-step procedure was followed.

Table 5
Mediation Analysis (Organizational Agility as Mediator)

Path	Predictor → Outcome	β	R^2	p-value	Mediation Type
a	DT → OA	0.614	0.377	0.000	—
b	OA → MP	0.412	0.351	0.000	—
c	DT → MP (Direct)	0.597	0.412	0.000	—
c'	DT → MP (With OA)	0.361	0.483	0.000	Partial

The coefficient for digital transformation decreased from 0.597 (direct) to 0.361 (indirect, after including OA), while remaining significant. This confirms partial mediation, validating H4 — organizational agility partially mediates the relationship between digital transformation and management practices.

Moderation Analysis

The moderating effect of technological readiness on the digital transformation–management practices relationship was tested using Hayes' PROCESS Macro (Model 1).

Table 6
Moderation Analysis (Technological Readiness as Moderator)

Predictor	β	SE	t	p-value
Digital Transformation (DT)	0.412	0.043	9.580	0.000
Technological Readiness (TR)	0.288	0.038	7.614	0.000
DT × TR (Interaction Term)	0.134	0.027	4.963	0.000

The interaction term ($\beta = 0.134$, $p < 0.001$) demonstrates that technological readiness significantly strengthens the impact of digital transformation on management practices. This supports H5, confirming the moderating effect. A simple slope analysis further indicated that at high levels of technological readiness, the effect of digital transformation on management practices was strongest ($\beta = 0.693$, $p < 0.001$), while at low readiness, the effect was weaker ($\beta = 0.385$, $p < 0.01$).

Table 7
Model Fit Indices

Fit Index	Value	Recommended Threshold
χ^2/df	2.38	< 3.00
RMSEA	0.048	< 0.08
CFI	0.951	> 0.90
TLI	0.937	> 0.90

These results confirm that the proposed conceptual model demonstrates excellent goodness-of-fit, supporting the hypothesized relationships.

Journal of Business Insight and Innovation
Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Table 8
Summary of Hypotheses Testing

Hypothesis	Statement	Result
H1	Digital Transformation → Management Practices	Supported
H2	Digital Transformation → Organizational Agility	Supported
H3	Organizational Agility → Management Practices	Supported
H4	OA mediates DT → MP	Supported (Partial Mediation)
H5	TR moderates DT → MP	Supported

The results validate all hypotheses, revealing that digital transformation significantly enhances management practices, both directly and indirectly, through agility and technological readiness.

Discussion

The present study aimed to investigate the impact of digital transformation (DT) on management practices (MP) within the banking and financial sector of Pakistan, incorporating the mediating role of organizational agility (OA) and moderating effect of technological readiness (TR). The results obtained from statistical analysis strongly support the hypothesized relationships and offer significant theoretical and practical implications for the management sciences discipline.

Interpretation of Findings

The findings revealed a strong positive relationship between digital transformation and management practices ($\beta = 0.597$, $p < 0.001$), indicating that the adoption of digital technologies substantially enhances managerial efficiency, strategic responsiveness, and operational control. This result aligns with previous studies (Kane et al., 2018; Vial, 2019; Warner & Wäger, 2019) suggesting that digital integration fosters more transparent, data-driven, and collaborative management frameworks.

The regression results demonstrate that digital transformation explains 41.2% of the variance in management practices, implying that almost half of managerial improvement in the banking sector can be attributed to the integration of digital systems such as AI-enabled analytics, process automation, and mobile banking platforms. This finding resonates with Tambe et al. (2019), who argued that data-driven management enhances both decision quality and speed, and Nambisan et al. (2019), who linked digital capabilities to innovation-oriented managerial decision-making.

The mediating role of organizational agility was also validated through partial mediation. This indicates that agility acts as a significant mechanism through which digital transformation influences management practices. In other words, while digital technology enables potential efficiency, it is the agile structure of an organization that allows managers to exploit that potential effectively. This finding supports Tallon et al. (2019) and Doz & Kosonen (2010), who highlighted agility as a key dimension of managerial adaptability in volatile digital environments.

The finding that technological readiness moderates the DT–MP relationship ($\beta = 0.134$, $p < 0.001$) emphasizes that organizations equipped with advanced technological infrastructure and skilled human capital are better positioned to translate digital transformation into tangible managerial benefits. This corroborates Matarazzo et al. (2021) and Raimo et al. (2023), who found that technological readiness enhances digital implementation success and strategic integration.

Comparison with Previous Literature

The study's outcomes are consistent with global empirical research that recognizes digital transformation as a primary catalyst for management innovation. Vial (2019) conceptualized digital transformation as a disruptive yet necessary process that redefines managerial structures. Similarly, Warner and Wäger (2019) emphasized that digitalization reshapes not only operations but also leadership mindsets and organizational learning capacities.

In developing economies, where digital infrastructures are still evolving, these effects are particularly significant. The current findings confirm those of Hussain et al. (2022), who argued that digital maturity

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Volume 3 Issue 2, 2024
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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remains uneven across Pakistani banks, with private institutions leading adoption due to greater resource flexibility and innovation capacity. Furthermore, the results echo Khan and Khan (2023), who reported that digital leadership enhances managerial innovation and adaptability in the banking sector. The present study extends their findings by introducing agility and readiness as mechanisms that operationalize digital leadership into measurable managerial improvements.

The mediation effect of organizational agility parallels findings by Queiroz et al. (2018) and Shuradze and Wagner (2020), who revealed that agility translates technological capability into strategic adaptability and responsiveness. Similarly, the moderating influence of technological readiness supports Parasuraman (2000), who posited that readiness determines whether digital tools are effectively integrated into business processes (Pasha et al., 2019).

Implications for Management Practice

The empirical evidence derived from this study has profound implications for managerial practice and institutional policy in the banking and financial sectors of Pakistan and comparable economies.

1. **Reorientation of Managerial Roles:** The integration of digital tools demands a paradigm shift in managerial roles, from traditional supervision toward data interpretation, system optimization, and strategic innovation. Managers must be digitally literate to effectively utilize analytics-based decision systems.
2. **Agile Management Systems:** Agility must be institutionalized within banking structures through flatter hierarchies, cross-functional teams, and flexible performance evaluation systems. Agile management allows rapid response to market and regulatory shifts, critical in the evolving fintech landscape.
3. **Investment in Technological Readiness:** The moderating results emphasize that technological readiness is not optional; it is a strategic necessity. Banks should invest in IT infrastructure, cloud computing systems, and employee digital skills training to enhance readiness.
4. **Cultural Transformation:** Beyond systems and processes, digital transformation necessitates a shift in organizational culture. Managers must promote openness to experimentation, failure tolerance, and continuous learning. The cultural shift enables sustained adaptability and innovation.
5. **Policy and Governance:** Regulatory bodies such as the State Bank of Pakistan (SBP) should establish frameworks supporting digital governance and cybersecurity to ensure safe and efficient digital transformation.

Theoretical Implications

From a theoretical standpoint, the findings advance the integration of the Resource-Based View (RBV) and Technology–Organization–Environment (TOE) frameworks.

- Under the RBV, digital transformation and technological readiness emerge as strategic resources that, when combined with organizational agility, lead to superior management performance.
- Within the TOE perspective, the interplay between organizational readiness and environmental demands explains the success of digital innovation in the banking sector.

The results validate the hybrid applicability of these theories in explaining digital transformation outcomes in developing economies, highlighting that technology adoption alone is insufficient without complementary organizational capabilities.

Contextual Insights: The Pakistani Banking Sector

The Pakistani banking system has evolved substantially in the last decade under the Digital Pakistan Vision, yet disparities persist between private and public institutions. This study reveals that private banks, equipped with more advanced digital infrastructures, demonstrate greater managerial adaptability compared to public sector counterparts, which still rely heavily on bureaucratic routines.

The regional context also reveals that employee digital literacy and managerial openness play a central role in realizing digital transformation. The need for human capital development through continuous training programs remains paramount to ensure the sustainability of digital initiatives.

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Contribution to Existing Knowledge

This study contributes to both academic literature and practical management in the following ways:

1. **Empirical Validation:** Provides one of the few empirical analyses linking digital transformation with management practices within a developing-country banking context.
2. **Integrated Framework:** Establishes a model that connects digital transformation, agility, and readiness, offering a holistic understanding of managerial evolution in the digital age.
3. **Sector-Specific Insights:** Focuses on the banking sector, an area central to economic modernization and digital finance development.
4. **Policy Guidance:** Offers actionable recommendations for policymakers, particularly in regions with emerging digital ecosystems.

Overall, the findings demonstrate that digital transformation significantly enhances management practices, primarily by improving data-driven decision-making, reducing operational delays, and increasing managerial flexibility. Organizational agility serves as a key enabler translating digital technologies into effective management outcomes, while technological readiness amplifies the strength of this relationship. These conclusions not only affirm existing theories but also provide a context-specific understanding of how digitalization reshapes management dynamics within developing economies' financial institutions.

Conclusion

The objective of this empirical study was to examine the impact of digital transformation on management practices in the banking and financial sector of Pakistan, while exploring the mediating role of organizational agility and moderating effect of technological readiness. Drawing upon data from 340 professionals across public and private banking institutions, the findings provide robust evidence that digital transformation significantly and positively influences managerial processes, decision-making efficiency, and organizational responsiveness.

The study confirmed that digital transformation is a critical enabler of managerial excellence. It redefines how banks formulate strategies, allocate resources, communicate decisions, and respond to market dynamics. Managers operating within digitalized systems are better equipped to make informed decisions based on real-time data analytics and predictive insights. This transition from traditional management practices toward technology-driven systems underscores the importance of integrating digital transformation into the very fabric of managerial functions.

The results further established that organizational agility partially mediates the digital transformation–management practices relationship. This implies that digital technologies alone are insufficient to guarantee improved managerial outcomes unless accompanied by flexible structures, rapid decision-making processes, and adaptive leadership styles. Agility enables institutions to respond proactively to regulatory, technological, and market shifts, converting digital potential into tangible performance gains.

Additionally, the study confirmed the moderating effect of technological readiness, highlighting that banks with superior technological infrastructure, digital literacy, and IT support systems are more successful in achieving managerial transformation. Technological readiness strengthens the relationship between digital transformation and management practices by enabling smoother technology adoption, reducing resistance to change, and ensuring integration across departments. From a broader theoretical standpoint, this study validates the complementary roles of the Resource-Based View (RBV) and the Technology–Organization–Environment (TOE) frameworks in explaining digital transformation outcomes. It suggests that while digital capabilities serve as strategic resources, organizational agility and technological readiness represent the contextual and environmental enablers that determine the magnitude of managerial improvement.

The research affirms that the convergence of technology, agility, and managerial innovation constitutes the foundation of modern banking success. The capacity to integrate digital transformation into management systems will determine not only competitive advantage but also institutional resilience in a volatile financial environment.

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Recommendations

Based on empirical findings and theoretical interpretation, the following recommendations are proposed for policy makers, bank executives, and future researchers:

Strengthening Digital Infrastructure

Banking institutions should continue investing in advanced IT infrastructures such as cloud computing, AI-based analytics, and cybersecurity systems. These technologies facilitate seamless operations, enable data-driven management, and enhance customer trust.

Enhancing Managerial Digital Competence

Continuous professional development programs should be institutionalized to strengthen digital literacy among managers and staff. Training in emerging technologies, data analytics, and agile management will equip employees with the competencies required for technology-driven decision-making.

Embedding Organizational Agility

Banks must cultivate an agile organizational culture that values flexibility, collaboration, and responsiveness. This can be achieved by decentralizing decision-making, reducing bureaucratic barriers, and forming cross-functional innovation teams to respond swiftly to changes in market or regulatory environments.

Institutionalizing Technological Readiness

Technological readiness should be treated as a long-term strategic goal. Banks should regularly assess their digital maturity, allocate dedicated budgets for technology upgrades, and establish internal policies encouraging experimentation and adoption of emerging tools.

Aligning Digital Transformation with Strategic Vision

Digital transformation initiatives should not be implemented in isolation but integrated within the broader strategic objectives of the organization. Executive management should ensure that technological innovations are aligned with institutional missions, risk management frameworks, and customer value propositions.

Strengthening Policy and Regulatory Support

Regulatory authorities, particularly the State Bank of Pakistan, should enhance digital governance frameworks, emphasizing data protection, digital finance policies, and cybersecurity compliance. Supportive regulations will encourage innovation while safeguarding the integrity of financial systems.

Promoting Collaborative Research and Innovation

Collaboration between academia, industry, and policymakers should be strengthened to promote evidence-based digital innovation. Research partnerships can generate insights that refine managerial strategies and accelerate technology adoption in the banking sector.

Limitations of the Study

Despite its contributions, this study has several limitations that offer directions for future research:

1. The cross-sectional design restricts the ability to infer causality; future research should employ longitudinal methods to assess changes over time.
2. The study focuses exclusively on the banking sector; expanding to other financial and non-financial industries could enhance generalizability.
3. Data were collected from selected regions of Pakistan; replication in other cultural or economic contexts could provide comparative insights.
4. The study primarily employed quantitative methods; integrating qualitative approaches could enrich understanding of managerial perceptions and challenges during digital transformation.

Directions for Future Research

Future studies could explore additional mediators and moderators influencing the digital transformation–management practices relationship. Constructs such as digital leadership, organizational learning, or innovation climate may further elucidate how digitalization impacts management efficiency.

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ISSN-p: 3006-2284, ISSN-e: 3006-0982
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Moreover, cross-country comparative studies across South Asia could provide broader insights into regional readiness and digital maturity differences.

Summary of Key Contributions

This study contributes to both theory and practice by:

- Providing empirical validation of the impact of digital transformation on management practices in the Pakistani banking context.
- Introducing organizational agility and technological readiness as integral mechanisms shaping managerial adaptation.
- Offering actionable strategies for developing agile, digitally competent, and resilient management systems.
- Supporting national digitalization goals and policy frameworks such as the Digital Pakistan Vision.

Final Remark

The transition from traditional management to digitalized systems is no longer optional but a strategic imperative. As the financial landscape continues to evolve under the forces of globalization and technological disruption, the banks that combine digital transformation with agile leadership and technological preparedness will emerge as leaders in innovation, customer satisfaction, and sustainable performance.

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