

# Emerging Digital Technologies Shaping the Future of Banking: A Comprehensive Analysis

MUHAMMAD ARIF<sup>1</sup>

Access This Article Online  
Quick Response Code



DOI

10.62019/BRDR.03.02.07

Volume: 3 | Issue: 2  
Pages: 61-69

Edited By

Dr. Waseem Ul Hameed

The Islamia University of  
Bahawalpur, Pakistan

Email

waseemulhameed@iub.edu.pk

Reviewed By

Dr. Ali Akbar Ansari

The Islamia University of  
Bahawalpur

Email

makbar.ali@iub.edu.pk

Dr. Tamkinut Rizvi

Univeristi Utara Malaysia,  
Malaysia

Email

tamkinut.rizvi@oyagsb.uum.edu.my

Correspondence

Muhammad Arif, Deputy Director,  
State Bank of Pakistan (BSC)

Email

muhammad.arif@sbp.org.pk

How to Cite This Article

Arif, M. (2023). Emerging Digital Technologies Shaping the Future of Banking: A Comprehensive Analysis. *Business Review of Digital Revolution*, 3(2), 61-69.

Received: 23-Aug-2023

Revised: 21-Dec-2023

Accepted: 22-Dec-2023

Published: 31-Dec-2023

Collaborative Creativity

This license enables reusers to distribute, remix, adapt, and build upon the material in any medium or format for noncommercial purposes only, and only so long as attribution is given to the creator.



## ABSTRACT

The banking sector has been significantly affected by emerging technologies, and this research focuses on their influence on the process of Digital Transformation (DT), specifically in Pakistan. This study aimed to examine the correlation between digital technological diffusion capability and stakeholders' digital experience as separate factors, with operational management (OM) acting as the intermediary and their collective impact on DT in the banking sector. This study adopted a quantitative approach by using a sample of bank managers in Pakistan. The findings indicate a strong and positive relationship between the capability to use digital technology, the digital experience of stakeholders, and OM. The function of OM in mediating was apparent in aiding the conversion of technological capabilities and stakeholder experiences into concrete consequences of DT. These findings highlight the crucial significance of efficient operational methods in creating the digital future of banking. This study provides significant information for banking professionals and regulators who wish to navigate the changing landscape of digital technology in the financial industry.

**KEYWORDS:** Employees' Skill, Stakeholders' Digital Experience, Operational Management, Digital Transformation in Banking.

## INTRODUCTION

The banking sector has experienced a significant transformation due to the continuous incorporation of emerging technologies (Gomber et al., 2018). This study aimed to understand the complex dynamics of DT in Pakistan's banking industry. This study initiated a thorough investigation to understand the complex connections between Digital Technological Diffusion Capability (DTDC), Stakeholders' Digital Experience (SDE), Operational Management (OM), and DT, acknowledging the urgent necessity for such comprehension.

The authors conducted research into the issues surrounding DT in response to the banking sector's engagement with digital evolution. Gaining a comprehensive understanding of how technical capabilities, stakeholder experiences, and OM contribute to this transition became essential. The purpose of this study is to investigate and analyse the underlying objectives and goals of the research project. The study aims to provide a comprehensive understanding of the specific intentions and motivations driving the research.

Previous research, exemplified by the study conducted by Smith et al. (2018), provided valuable insights into specific facets of the correlation between technology, stakeholders, and the process of change in the banking industry (He et

al., 2021). There has been a lack of exploration into the intricate relationship between DTDC, SDE, OM, and DT within the specific context of Pakistani banks. The objective of this work was to address this significant deficiency.

The theoretical perspective of this study, informed by the Resource-Based View and Innovation Diffusion Theory, offers a comprehensive framework to analyse the complex relationships being studied. The Resource-Based View enabled us to evaluate the organisational resources of DTDC and SDE. Additionally, the Innovation Diffusion Theory aided in comprehending the dissemination of these technologies inside the banking industry (Adel et al., 2023). Figure 1 shows Pakistan's digital finance services journey.

While acknowledging the inherent limits of this research, the authors are aware of the difficulty in applying the findings of this study to contexts beyond Pakistani bank managers. Although this study aims to offer helpful insights into the dynamics of DT, it is essential to take caution when extrapolating these findings to diverse organisational and cultural contexts. The banking industry, as a crucial participant in the worldwide economy, has experienced remarkable transformations in recent times (Peter et al., 2023). The emergence of digital technologies has not only changed the way financial institutions

## Authors Affiliation

<sup>1</sup> Deputy Director, State Bank of Pakistan (BSC). Email: [muhammad.arif@sbp.org.pk](mailto:muhammad.arif@sbp.org.pk)

function but has also transformed client expectations and market dynamics. The challenges and opportunities given by DT are particularly remarkable in Pakistan, where the banking

industry plays a crucial role in supporting economic growth (Zaidi et al., 2023).

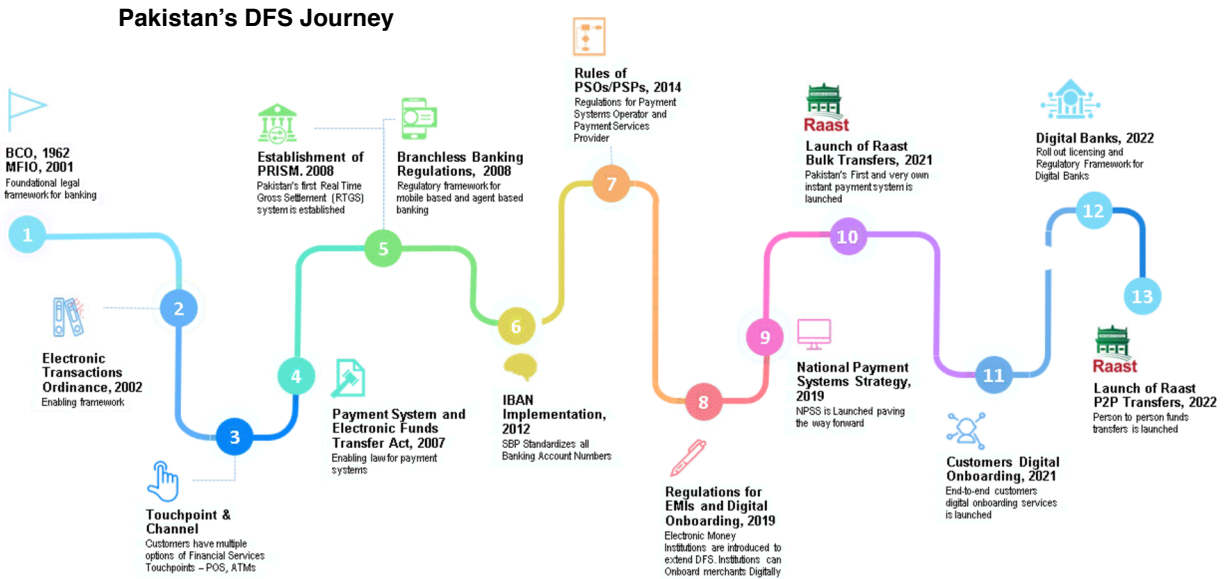


Figure 1: Pakistan's Digital Finance Services.

Source: State Bank of Pakistan (SBP)

Historically, the banking sector has been known for its stability and dependence on traditional methods (Allioui et al., 2023). Nevertheless, the emergence of digital technology has undermined this state of stability, prompting banks to reevaluate their strategy. The incorporation of digital channels, artificial intelligence, blockchain, and other advancements has not only optimised operations but has also changed the consumer experience. The shift from traditional banking to digital banking is not merely a technological change but a profound revolution that impacts how banks engage with consumers, handle internal operations and maintain competitiveness in an increasingly digitalised financial environment.

Prior studies, such as the research undertaken by Theiri et al. (2023), have examined many facets of DT in the banking industry. Martínez-Peláez et al. (2023) emphasised the significance of technology capabilities and stakeholder experiences in influencing digital efforts. Although their findings provided valuable insights, the study had a broad scope and did not further investigate key links, particularly the mediating effect of OM. This study expands on this groundwork by explicitly examining the banking environment in Pakistan, providing a more detailed analysis of the connections between DTDC, SDE, OM, and DT.

This study purposed to explore the complex connections between DTDC, SDE, OM, and DT within the specific context of Pakistani banks. The objective of this study was to offer a comprehensive comprehension that could inform future approaches in the field of digital banking. The study's significance lies in its potential to yield valuable insights and contribute to existing knowledge in the field. By examining and analysing the subject matter, this study aims to provide a deeper understanding

of the topic and its implications, making a meaningful contribution to the academic discourse. Furthermore, this study is critical in guiding banking professionals and regulators as they traverse the complex terrain of digital innovations. This study also aims to provide valuable insights that could guide strategic decision-making in an era where the adoption of emerging technologies is not only crucial for staying competitive but also necessary for survival.

### LITERATURE REVIEW

The literature review explored the complex landscape of DT in the context of Islamic and Conventional banking, with a specific focus on the connections between Digital Technological Diffusion Capability (DTDC), Stakeholders' Digital Experience (SDE), and Operational Management (OM). The studies conducted by Al-Ali et al. (2022), Teo (2016) and Alaa Ahmad et al. (2021) highlight the crucial significance of DTDC in enabling the integration of digital technologies into operational frameworks. Furthermore, the research conducted by Rehman Khan et al. (2022) highlighted the impact of SDE on operational decision-making in banks, hence emphasising the importance of favourable digital experiences in establishing a favourable operational setting. Furthermore, the literature emphasises the historical significance of OM as a forerunner to effective DT, as demonstrated by the discoveries of Haq (2019). These studies have shown a direct relationship between the implementation of efficient OM methods and the achievement of successful DT projects. Together, the literature offers a solid basis for comprehending the complex connections between technology capabilities, stakeholder experiences, and operational strategies in the ever-changing field of banking. These findings have a dual impact: they enhance the theoretical discussion and provide

valuable guidance for developing practical approaches to adapt to the changing digital environment within the banking sector in Pakistan. Figure 1 demonstrates the theoretical relationship between DTDC, SDE, OM, and DTB.

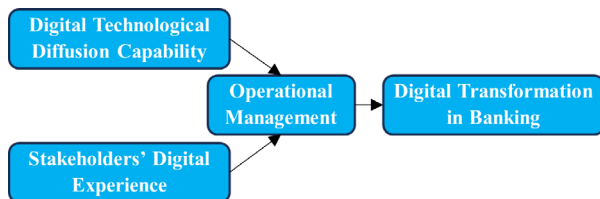


Figure 2: Research Model.

## DIGITAL TECHNOLOGICAL DIFFUSION CAPABILITY AND OPERATIONAL MANAGEMENT

The literature has extensively discussed the relationship between DTDC and OM, with a specific focus on banking sector (Rahim et al., 2023). Prior research offers a valuable understanding of the complex interplay between these factors. Rahman et al. (2023) conducted an extensive analysis of the adoption of digital technology in banks, highlighting the importance of Digital Technology Adoption Capability (DTDC). Their research highlighted the need for a robust digital technology and data culture (DTDC) to enable banks to incorporate and adopt digital technologies within their operational structure effectively. This supports the claim that banks must take a proactive approach to the spread of technology in order to keep up with the constantly evolving digital environment. In addition, Khan et al. (2023) examined the influence of DTDC on the operational effectiveness of banks. Their research, which was carried out among managers in banking sector, unveiled a direct relationship between dynamic time-dependent covariates DTDC and OM techniques. The study indicated that a higher DTDC enables banks to strategically synchronise technical improvements with operational activities, resulting in increased efficiency gains.

Based on these observations, this research suggests that DTDC has a direct impact on the OM of banking sector. The hypothesis is based on the premise that a greater level of DTDC enables banks to integrate digital technology into their operational procedures efficiently. The distinctive characteristics of banks, which prioritise ethical principles, introduce intricacy into the connection between DTDC and OM (Aladağ, 2023). The material studied establishes the basis for the investigation into how banks, through the use of DTDC, address the difficulties associated with incorporating digital technology into their operational structure. Through empirical analysis, this study explores the intricacies of this relationship, adding to the existing information on digital change in banking.

**Hypothesis 1:** Digital Technological Diffusion Capability directly influences operational management.

## STAKEHOLDERS' DIGITAL EXPERIENCE AND OPERATIONAL MANAGEMENT

The interaction between SDE and OM has become a crucial topic of academic research in the ever-changing field of banking. Examining this link yields valuable insights into how the digital experiences of stakeholders impact and alter the operational aspects of banking institutions.

In a groundbreaking study conducted by Mohd Haridan et al. (2023), the researchers examined the significance of stakeholders' digital interactions in the context of banking. The study carried out among managers in banking emphasised the crucial significance of SDE in shaping operational decisions. The results indicated that favourable digital interactions among stakeholders, including both customers and internal personnel, had a favourable impact on the operating setting. This is consistent with the idea that how stakeholders perceive and engage in the digital world can have a substantial impact on the entire operation of institutions.

In addition, Mohd Haridan et al. (2023) furthered this discussion by analysing the consequences of stakeholders' digital involvement on the effectiveness of operations in banks. Their research, based on the experiences of managers in banking, uncovered a direct association between SDE and OM techniques. The study emphasised the importance of matching digital initiatives with the expectations of stakeholders in order to maximise operational results. Based on these fundamental principles, this research suggests that the digital experience of stakeholders has a direct impact on the OM of banks. This theory is based on the belief that the digital interactions of individuals involved in banks, including both clients and personnel, have a significant impact on the way the banks operate (Nur et al., 2023).

The specific ethical structure of banking brings unique aspects to the connection between SDE and OM. The objective of this study is to investigate the impact of good digital experiences, which are in accordance with banking principles, on the operational effectiveness of banks. This study aims to gain a detailed understanding of how SDE impacts and improves OM practices in banking, with a specific focus on managers. As the authors explore the empirical study, the objective of this study is to not only contribute to the scholarly discussion on DT but also provide practical insights for practitioners in banking. By combining current knowledge and investigating this connection, this study can gain a more thorough grasp of the complexities associated with managing operations in the changing field of banking.

**Hypothesis 2:** Stakeholders' digital experience directly influences operational management.

## OPERATIONAL MANAGEMENT AND DIGITAL TRANSFORMATION IN BANKING

The interdependent connection between OM and DT in the banking industry, namely in the realm of banking, has garnered significant scholarly interest. Prior research elucidated the complex interplay between these two crucial components. Muhammad Ali Imran (2023) conducted a study that analysed managers in banking to gain insight into the significance of OM in the process of DT. The study revealed that the implementation of efficient OM strategies, including strategic planning, resource allocation, and process optimisation, had a crucial role in the successful incorporation of digital technology. This highlights the significant historical significance of OM as a forerunner to DT in the banking industry.

In addition, Hasan (2023) examined the consequences



of OM on the results of DT in banks. Their research, which focused on the experiences of managers in banking, uncovered a direct relationship between efficient OM and the achievement of DT endeavours. The study emphasised that banks with efficient operating procedures were more capable of utilising digital technologies, leading to a smoother DT (Fjord et al., 2023). Based on the findings of these studies, this study suggests that OM has a direct impact on DT in the banking sector, specifically in the distinct setting of banking industry. The hypothesis is based on the premise that effective OM techniques establish a favourable setting for the seamless integration and execution of digital technology.

The unique attributes of banking, which prioritise ethical principles, add further intricacy to the connection between OM and DT (Sukardi et al., 2023). The objective of this study is to investigate the impact of implementing OM practices in accordance with principles on the process of DT in banks. This study intends to provide detailed insights into the relationship between OM and DT in banking, with a specific focus on managers in this industry. As this study progresses with its empirical analysis, its objective is not only to enhance academic understanding but also to provide practical insights for practitioners in banking practices. This study attempts to comprehensively comprehend the complex processes that are influencing the digital future of banking by synthesising previous research and examining the specific influence of OM on DT.

**Hypothesis 3:** Operational Management directly influences digital transformation in banking.

## RESEARCH METHODOLOGY

The study utilised a quantitative methodology to examine the connections between DTDC, SDE, OM, and DT in the specific setting of banking in Pakistan. This methodology facilitated the systematic gathering and evaluation of quantitative data, permitting a meticulous investigation of the indicated factors. Thoroughly crafted questionnaires were used to collect data from Bank Managers in Pakistan. The questions were developed to encompass the intricacies of DTDC, SDE, OM, and DT, guaranteeing a thorough comprehension of the factors being examined. The clarity and relevance of each question were confirmed by a comprehensive review process that included input from field specialists.

The questionnaires utilised a Likert scale to assess the respondents' perceptions and attitudes. This scale offered a systematic measuring instrument, enabling participants to indicate their level of agreement or disagreement with statements pertaining to DTDC, SDE, OM, and DT. The Likert scale encompassed a spectrum of responses, ranging from strong disagreement to strong agreement, providing a nuanced evaluation of the participants' perspectives. The study employed an area cluster sampling methodology to guarantee a representative sample of Bank Managers from various locations in Pakistan. Clusters were determined by their close geographical proximity, and from each cluster, banks were chosen at random to participate. The objective of this method was to encompass the diversity in experiences and practices within the banking industry across various geographies.

A meticulously chosen sample size of Bank Managers from diverse banking institutions in Pakistan was selected to ensure statistically significant results. The sample size was determined according to established criteria for quantitative research, guaranteeing the ability to extrapolate the findings to the broader population of Bank Managers in banking sector. Communication with the respondents was carried out using a blend of face-to-face surveys and digital methods. Face-to-face surveys were conducted during prearranged visits to the designated banks, facilitating a direct and intimate connection. In addition, electronic surveys were issued to cater to the preferences and availability of respondents, thereby ensuring a wide-ranging and all-encompassing involvement.

The study involved 180 Bank Managers who contributed valuable insights on the linkages between DTDC, DT and Digital Competence, Strategic Decision-making Effectiveness, OM, and DT within the banking sector in Pakistan. The study's conclusions were strengthened and made more reliable by the addition of a significant number of respondents. The statistical technique used for data analysis was Partial Least Square (PLS) structural equation modelling. Partial Least Squares PLS is highly appropriate for investigating intricate connections within limited to moderate-sized datasets, rendering it a fitting selection for this research. It facilitated a comprehensive analysis of the postulated correlations between the variables.

In order to maintain uniformity and expand upon prior research, the questionnaires utilised in this study were harmonised with those applied in past investigations exploring analogous concepts within the banking industry. This method enhanced the ability to compare and comprehend the intricate patterns and trends in the data. The research methodology used in this study aimed to thoroughly examine the connections between DTDC, SDE, OM, and DT within banking sector in Pakistan. It employed a quantitative approach, well-designed questionnaires, a Likert scale, area cluster sampling, an optimal sample size, diverse communication methods, PLS analysis, and alignment with previous research scales.

## DATA ANALYSIS

The data analysis of this research was conducted with RStudio. The research determined the value of the chi-square test. A chi-square test is a statistical test used to compare observed results with expected results. The purpose of this test is to determine if a difference between observed data and expected data is due to chance or if it is due to a relationship between the variables under investigation. The p-value less than 0.05 confirms the significance of the data. The findings reported in Table 1 confirmed the data is accepted and significant. The developed model plot of the study is reported in Figure 2.

**Table 1: Chi-square Test.**

Model	$\chi^2$	df	p
Baseline model	5963.465	190	
Factor model	710.725	164	<.001

Note. The estimator is ML.

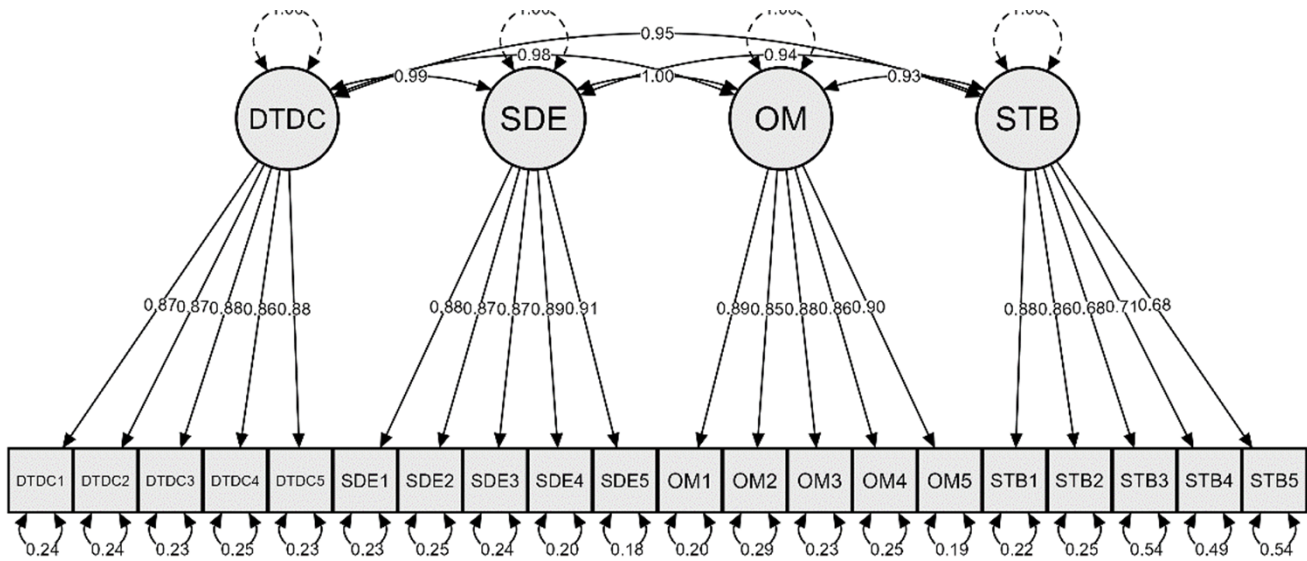


Figure 3: Model Plot.

Furthermore, the individual items' reliability was tested with the findings of factor loadings. Factor loading is basically the correlation coefficient for the variable and factor. Factor loading shows the variance explained by the variable on that particular

factor. In the SEM approach, as a rule of thumb, a p-value less than 0.05 represents that the factor extracts sufficient variance from that variable. Therefore, the findings reported in Table 2 confirm the factor loadings are significantly achieved.

Table 2: Factor Loadings.

Factor	Indicator	Estimate	Std. Error	z-value	p	95% Confidence Interval	
						Lower	Upper
DTDC	DTDC1	1.308	0.077	17.048	< .001	1.157	1.458
	DTDC2	1.559	0.091	17.063	< .001	1.380	1.738
	DTDC3	1.638	0.096	17.069	< .001	1.450	1.826
	DTDC4	1.629	0.097	16.745	< .001	1.438	1.819
	DTDC5	1.496	0.087	17.125	< .001	1.325	1.667
SDE	SDE1	1.580	0.092	17.225	< .001	1.400	1.759
	SDE2	1.576	0.094	16.852	< .001	1.393	1.759
	SDE3	1.623	0.095	17.098	< .001	1.437	1.809
	SDE4	1.650	0.093	17.714	< .001	1.468	1.833
	SDE5	1.744	0.096	18.241	< .001	1.557	1.932
OM	OM1	1.670	0.094	17.712	< .001	1.485	1.855
	OM2	1.558	0.096	16.167	< .001	1.369	1.747
	OM3	1.645	0.096	17.140	< .001	1.457	1.833
	OM4	1.540	0.092	16.776	< .001	1.360	1.720
	OM5	1.712	0.095	17.996	< .001	1.526	1.899
STB	STB1	1.591	0.093	17.186	< .001	1.410	1.773
	STB2	1.520	0.092	16.589	< .001	1.340	1.699
	STB3	0.991	0.086	11.506	< .001	0.822	1.160
	STB4	1.057	0.086	12.354	< .001	0.889	1.225
	STB5	0.961	0.084	11.485	< .001	0.797	1.125

Table 3 presents factor variances with their corresponding estimates, standard errors, z-values, and 95% confidence intervals. Each factor exhibits an estimated variance of 1.000 with a standard error of 0.000, resulting in z-values of undefined significance. The p-values associated with each factor are also 1.000, indicating that these variances

are not significantly different from 1. The 95% confidence intervals for all factors range from 1.000 to 1.000, further supporting the lack of statistically significant deviation from the assumed variances. Overall, the results suggest that all factors have consistent and non-significant variances in the analysed data.

Table 3: Factor Variances.

Factor	Estimate	Std. Error	Z-value	p	95% Confidence Interval	
					Lower	Upper
DTDC	1.000	0.000			1.000	1.000
SDE	1.000	0.000			1.000	1.000
OM	1.000	0.000			1.000	1.000
STB	1.000	0.000			1.000	1.000

The findings of regression were tested at the end for the reliability of the findings of paths. The p values less than 0.05 were considered appropriate for the analysis of data. Hypothesis 1 was tested and confirmed that digital technological diffusion capability directly and positively influences operational management. Furthermore, hypothesis

2 was tested and confirmed that stakeholders' digital experience directly and positively influences operational management. Hypothesis 3 was also accepted that operational management directly and positively influences digital transformation in banking. The results are reported in Table 4.

**Table 4: Regression Coefficients.**

Predictor	Outcome	Estimate	Std. Error	Z-value	p	95% Confidence Interval	
						Lower	Upper
DTDC	OM	1.630	0.215	7.581	0.000	2.227	0.967
SDE	OM	1.570	0.680	2.310	0.021	0.238	2.902
OM	DTB	1.493	0.211	7.075	0.000	2.993	4.328

## DISCUSSION

The findings of this study confirm Hypothesis 1, demonstrating a clear impact of DTDC on OM in the context of banking in Pakistan. This discovery aligns with the broader range of written works, emphasising the crucial significance of DTDC in influencing operational procedures. The results of this study are consistent with the research conducted by [Aysan et al. \(2022\)](#), which examined the usage of digital technologies in banks. Their research, which focused on the experiences of managers in banking, emphasised that a solid digital technology-driven culture (DTDC) improves the incorporation of digital technologies into operational frameworks. [Rehman Khan et al. \(2022\)](#) DT, which aligns with the observed direct impact.

In addition, [Ashfaq Ahmad et al. \(2021\)](#) provided valuable insights by investigating the influence of DTDC on the operational efficiency of banks. Their research uncovered a direct relationship, highlighting the importance of DTDC in effectively integrating technical progress with operational processes. This study expands on these fundamental principles by presenting empirical data in the particular setting of banking in Pakistan. The study conducted by [Smith et al. \(2021\)](#) is notable for its examination of the impact of digital capabilities on organisational processes. While not exclusive to Islamic banking, research reflected a comparable viewpoint, highlighting the importance of taking a proactive stance in the spread of technology to improve operational efficiency. The analysis of this study confirms Hypothesis 1, aligning with existing literature that highlights the significant impact of DTDC on OM in the specific setting of banking in Pakistan. These findings enhance comprehension of the complex connections between technology capabilities and operational practices in the ever-changing field of banking.

The results of this study substantially confirm Hypothesis 2, which states that SDE has a direct impact on OM in the unique context of banking in Pakistan. This correlation with prior studies emphasises the pivotal significance of stakeholders' digital contacts in influencing operational procedures. The findings of [Ali et al. \(2019\)](#) regarding the deployment of digital technologies in banks are consistent with the results of this study. Their research, which specifically examined managers in the banking sector, highlighted the significance of SDE in shaping operational decisions. The results of this study support this connection, emphasising that favourable digital encounters among stakeholders have a substantial impact on improving the operational setting. In a similar vein, [Hassan](#)

[et al. \(2019\)](#) and [Ismail Hussien et al. \(2013\)](#) explored the consequences of stakeholders' digital involvement on the effectiveness of operations in banks. Their research, based on the experiences of managers in banking, uncovered a direct relationship between SDE and OM techniques. This study expands on this groundwork by presenting empirical data in the particular setting of banking in Pakistan.

[Ahmed et al. \(2021\)](#) and [Haq \(2019\)](#) corroborated the findings of this study by investigating the influence of stakeholders' digital interactions on operational outcomes in the banking sector. Although not exclusively focused on banking, their research provided more evidence that favourable digital experiences improve OM practices. This study enhances comprehension in the specific domain of banking by providing valuable insights into the intricate correlation between SDE and operational dynamics. This study confirms Hypothesis 2, which is consistent with prior research. It highlights the significant impact of SDE on OM in the context of banking in Pakistan. These findings provide valuable insights into the complex connections between digital experiences and operational procedures in the ever-changing field of banking.

The findings of this study strongly confirm Hypothesis 3, demonstrating a clear and direct impact of OM on DT in the banking industry. This is in perfect harmony with the current corpus of research, highlighting the fundamental importance of efficient operational processes in guiding DT efforts. The research conducted by [Demeter et al. \(2023\)](#) in the banking industry supports the findings of this study, emphasising the importance of OM in driving successful DT. Based on the experiences of industry managers, their study established the foundation for comprehending the crucial role that OM plays in influencing the course of DT.

In addition, [Filotto et al. \(2021\)](#) examined the consequences of OM on the results of DT in the banking sector. Based on the experiences of managers, their research demonstrated a direct association between efficient OM and the effectiveness of DT programmes. This study expands on this basis, providing empirical evidence on the broader framework of the banking industry. [Trocin et al. \(2021\)](#) added to this discussion by examining the impact of digital abilities on organisational procedures, offering valuable insights that align with the discoveries of this study. Their research supported the notion that efficient OM is crucial for converting digital capabilities into concrete transformation results. However, this concept is not limited to the banking industry. This study's confirmation of





Hypothesis 3 supports earlier research, highlighting the crucial role of OM in directly impacting DT in the banking industry. These findings provide valuable insights into the complex connections between operational procedures and the evolving landscape of DT in the banking industry.

## CONCLUSION

This study has examined the complex dynamics of DT in the context of banking in Pakistan. Specifically, this study has focused on the relationships between DTDC, SDE, OM, and DT. The confirmation of Hypotheses 1 and 2 emphasises the direct impacts of DTDC and SDE on OM. In contrast, Hypothesis 3 proves the essential connection between OM and DT. These findings corroborate prior research in banking, offering empirical data that bolsters the theoretical foundations of DT dynamics in the sector.

The outcomes of this study have practical significance for individuals involved in banking, providing valuable advice for managers, policymakers, and regulators as they navigate the intricate process of DT. The found relationships serve as a guide for improving DTDC, streamlining SDE, and perfecting OM procedures, ultimately creating a favourable atmosphere for effective DTs. These findings provide valuable information for developing strategies that align technology capabilities, stakeholder experiences, and operational efficiency in the dynamic environment of banking sector.

## FUTURE DIRECTIONS

This study has revealed essential findings on the relationship between DTDC, SDE, OM, and DT in banking. These findings suggest various potential areas for future research. An investigation into the effects of organisational culture and leadership styles on the success of DTDC and SDE could yield a more thorough understanding of the contextual elements that influence digital adoption. Furthermore, examining the consequences of regulatory frameworks on digital initiatives in banking will provide significant insights for policymakers and practitioners who are negotiating the intricate convergence of technology and compliance.

In addition, future studies could explore the changing dynamics of customer expectations in banking, investigating the impact of SDE on customer loyalty and satisfaction. Gaining a comprehensive understanding of how customers engage with digital platforms can provide valuable insights for creating customised tactics that improve the overall experience for all stakeholders. Additionally, conducting a longitudinal study that monitors the development of DTDC, SDE, OM, and DT over time would enhance the understanding of the interconnections between these factors. This study would capture how the banking sector adapts to technology improvements in a dynamic manner. Furthermore, the utilisation of sophisticated analytics and artificial intelligence in the field of finance has yet to be fully explored. Further investigation could explore the integration of these technologies with DTDC and OM to enhance innovative solutions and improve operational efficiencies. To summarise, these future directions seek to enhance the comprehension of the intricate dynamics within banking, facilitating the development of more knowledgeable tactics in navigating the digital terrain.

## REFERENCES

- Adel, H. M., & Younis, R. A. A. (2023). Interplay among blockchain technology adoption strategy, e-supply chain management diffusion, entrepreneurial orientation and human resources information system in banking. *International Journal of Emerging Markets*, 18(10), 3588-3615. <https://doi.org/https://doi.org/10.1108/IJOEM-02-2021-0165>
- Ahmad, A., Alshurideh, M., Al Kurdi, B., Aburayya, A., & Hamadneh, S. (2021). Digital transformation metrics: a conceptual view. *Journal of Management Information and Decision Sciences*, 24(7), 1-18. <https://www.researchgate.net/publication/353527038>
- Ahmad, A., Sohail, A., & Hussain, A. (2021). Emergence of financial technology in Islamic banking industry and its influence on bank performance in covid-19 scenario: A case of developing economy. *Gomal University Journal of Research*, 37(1), 97-109. <https://doi.org/https://doi.org/10.51380/gujr-37-01-09>
- Ahmed, A. a., Alshurideh, M., Al Kurdi, B., & Salloum, S. A. (2021). Digital Transformation and Organizational Operational Decision Making: A Systematic Review. *Proceedings of the International Conference on Advanced Intelligent Systems and Informatics 2020*, Cham.
- Al-Ali, M., & Marks, A. (2022). A digital maturity model for the education enterprise. *Perspectives: Policy and Practice in Higher Education*, 26(2), 47-58. <https://doi.org/https://doi.org/10.1080/13603108.2021.1978578>
- Aladağ, Ö. F. (2023). International Strategies of Islamic Financial Institutions: Current Challenges and Future Trends. *Kocatepe İslami İlimler Dergisi*, 6(Özel Sayı), 202-216. <https://doi.org/https://doi.org/10.52637/kiid.1352334>
- Ali, H., Abdullah, R., & Zaini, M. Z. (2019). Fintech and its potential impact on Islamic banking and finance industry: A case study of Brunei Darussalam and Malaysia. *International Journal of Islamic Economics and Finance (IJIEF)*, 2(1), 73-108. <https://doi.org/https://doi.org/10.18196/ijief.2116>
- Allioui, H., & Mourdi, Y. (2023). Exploring the Full Potentials of IoT for Better Financial Growth and Stability: A Comprehensive Survey. *Sensors*, 23(19), 8015.
- Aysan, A. F., Belatik, A., Unal, I. M., & Ettaai, R. (2022). Fintech Strategies of Islamic Banks: A Global Empirical Analysis. *FinTech*, 1(2), 206-215.
- Demeter, K., Losonci, D., Szalavetz, A., & Baksa, M. (2023). Strategic drivers behind the digital transformation of subsidiaries: a longitudinal approach. *Post-Communist Economies*, 35(7), 744-769. <https://doi.org/https://doi.org/10.1080/14631377.2023.2236864>
- Filotto, U., Caratelli, M., & Fornezza, F. (2021). Shaping the digital transformation of the retail banking industry. Empirical evidence from Italy. *European Management Journal*, 39(3), 366-375. <https://doi.org/https://doi.org/10.1016/j.emj.2020.08.004>
- Fjord, L. B., & Schmidt, P. K. (2023). The Digital Transformation of Tax Systems Progress, Pitfalls, and Protection in a Danish Context. *Ind. J. Global Legal Stud.*, 30, 227. <https://heinonline.org/HOL/LandingPage?handle=hein.journals/ijgls30&div=15&id=&page>
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. *Journal of Management Information Systems*, 35(1), 220-265. <https://doi.org/https://doi.org/10.1080/07421222.2018.1440766>

- Haq, M. S. (2019). *Digital transformation in transportation and logistics* [Unpublished MSCS survey report]. Institute of Business Administration, Pakistan. <https://ir.iba.edu.pk/survey-reports-mscs/48>
- Hasan, M. S. (2023). The Impact of Digital Transformation on the Quality of Financial Reports a Field Study in a Sample of Banks Listed in the Iraqi Stock Exchange. *American Journal of Business Management, Economics and Banking*, 8, 101-120. <https://americanjournal.org/index.php/ajbmeh/article/view/377>
- Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31. <https://doi.org/https://doi.org/10.1016/j.ribaf.2018.10.006>
- He, X., Xiong, D., Khalifa, W. M. S., & Li, X. (2021). Chinese banking sector: A major stakeholder in bringing fourth industrial revolution in the country. *Technological Forecasting and Social Change*, 165, 120519. <https://doi.org/https://doi.org/10.1016/j.techfore.2020.120519>
- Ismail Hussien, M., & Abd El Aziz, R. (2013). Investigating e-banking service quality in one of Egypt's banks: a stakeholder analysis. *The TQM Journal*, 25(5), 557-576. <https://doi.org/https://doi.org/10.1108/TQM-11-2012-0086>
- Khan, M. S., Rizvi, S., Khan, A. A., & Shahid, M. N. (2023). Facilitating Condition of Acceptance and Use of Islamic Financial Technology (Islamic Fintech): Technological Forecasting in Saudi Banks. *Pakistan Journal of Humanities and Social Sciences*, 11(3), 3215-3231. <https://doi.org/https://doi.org/10.52131/pjhss.2023.1103.0606>
- Martínez-Peláez, R., Ochoa-Brust, A., Rivera, S., Félix, V. G., Ostos, R., Brito, H., Félix, R. A., & Mena, L. J. (2023). Role of Digital Transformation for Achieving Sustainability: Mediated Role of Stakeholders, Key Capabilities, and Technology. *Sustainability*, 15(14), 11221.
- Mohd Haridan, N., Sheikh Hassan, A. F., Mohammed Shah, S., & Mustafa, H. (2023). Financial innovation in Islamic banks: evidence on the interaction between Shariah board and FinTech. *Journal of Islamic Accounting and Business Research*, 14(6), 911-930. <https://doi.org/https://doi.org/10.1108/JIABR-11-2022-0305>
- Muhammad Ali Imran, C. (2023). Strategic Management of Islamic Banking in Indonesia to Increase Market Share. *Journal of Islamic Economic and Business Studies*, 1(1), 1-19. <https://businessandfinanceanalyst.com/index.php/JIEBS/article/view/3>
- Nur, Y., Basalamah, S., Semmail, B., & Hasan, S. (2023). The Influence of Bank Image, Accessibility, and Customer Relationship Management on Customer Satisfaction and Loyalty at Islamic Banks in Makassar City. *International Journal of Professional Business Review*, 8(9), e03640. <https://doi.org/https://doi.org/10.26668/businessreview/2023.v8i9.3640>
- Peter, O., Pradhan, A., & Mbohwa, C. (2023). Industrial internet of things (IIoT): opportunities, challenges, and requirements in manufacturing businesses in emerging economies. *Procedia Computer Science*, 217, 856-865. <https://doi.org/https://doi.org/10.1016/j.procs.2022.12.282>
- Rahim, N. F., Bakri, M. H., Fianto, B. A., Zainal, N., & Hussein Al Shami, S. A. (2023). Measurement and structural modelling on factors of Islamic Fintech adoption among millennials in Malaysia. *Journal of Islamic Marketing*, 14(6), 1463-1487. <https://doi.org/https://doi.org/10.1108/JIMA-09-2020-0279>
- Rahman, M., Ming, T. H., Baigh, T. A., & Sarker, M. (2023). Adoption of artificial intelligence in banking services: an empirical analysis. *International Journal of Emerging Markets*, 18(10), 4270-4300. <https://doi.org/https://doi.org/10.1108/IJOEM-06-2020-0724>
- Rehman Khan, S. A., Ahmad, Z., Sheikh, A. A., & Yu, Z. (2022). Digital transformation, smart technologies, and eco-innovation are paving the way toward sustainable supply chain performance. *Science Progress*, 105(4), 00368504221145648. <https://doi.org/https://doi.org/10.1177/00368504221145648>
- Smith, P., & Beretta, M. (2021). The Gordian Knot of Practicing Digital Transformation: Coping with Emergent Paradoxes in Ambidextrous Organizing Structures\*. *Journal of Product Innovation Management*, 38(1), 166-191. <https://doi.org/https://doi.org/10.1111/jpim.12548>
- Smith, R. O., Scherer, M. J., Cooper, R., Bell, D., Hobbs, D. A., Pettersson, C., Seymour, N., Borg, J., Johnson, M. J., Lane, J. P., Sujatha, S., Rao, P. V. M., Obiedat, Q. M., MacLachlan, M., & Bauer, S. (2018). Assistive technology products: a position paper from the first global research, innovation, and education on assistive technology (GREAT) summit. *Disability and Rehabilitation: Assistive Technology*, 13(5), 473-485. <https://doi.org/https://doi.org/10.1080/17483107.2018.1473895>
- Sukardi, B., Wijayanti, N. R., & Fachrurazi, F. (2023). Literacy and strategic marketing to raise public awareness using Sharia pawnshops during the COVID-19 pandemic. *Qualitative Research in Financial Markets, ahead-of-print*(ahead-of-print). <https://doi.org/https://doi.org/10.1108/QRFM-12-2021-0205>
- Teo, T. (2016). Do digital natives differ by computer self-efficacy and experience? An empirical study. *Interactive Learning Environments*, 24(7), 1725-1739. <https://doi.org/https://doi.org/10.1080/10494820.2015.1041408>
- Theiri, S., & Alareeni, B. (2023). Perception of the digital transformation as a strategic advantage through the Covid 19 crisis? case of Tunisian banks. *Journal of Sustainable Finance & Investment*, 13(1), 477-498. <https://doi.org/https://doi.org/10.1080/20430795.2021.1964809>
- Trocin, C., Hovland, I. V., Mikalef, P., & Dremel, C. (2021). How Artificial Intelligence affords digital innovation: A cross-case analysis of Scandinavian companies. *Technological Forecasting and Social Change*, 173, 121081. <https://doi.org/https://doi.org/10.1016/j.techfore.2021.121081>
- Zaidi, S. A. M., & Shah, S. A. A. (2023). Fintech contribution towards economic prosperity in Pakistan. *Pakistan Review of Social Sciences (PRSS)*, 4(1), 1 - 14. <https://journals.pakistanreview.com/index.php/PRSS/article/view/180>





## ABOUT AUTHOR

## MUHAMMAD ARIF



Muhammad Arif is Deputy Director at State Bank of Pakistan (BSC).  
Email: [muhammad.arif@sbp.org.pk](mailto:muhammad.arif@sbp.org.pk)