DIGITAL FINANCE STRATEGY AND BANK PERFORMANCE IN EMERGING MARKETS: THE ROLE OF FINANCIAL SOUNDNESS

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Abstract

This study investigates the impact of digital financial technologies (FinTechs) — such as electronic clearing systems, payment cards, and e-wallets — on the financial performance of Jordanian banks amid rapid digital transformation. While prior research has acknowledged the benefits of FinTech, few studies have examined the mechanisms through which these technologies influence financial performance, particularly in emerging markets. This study addresses this gap by evaluating both the direct effects of digital technologies and their indirect effects through financial soundness as a mediating variable. Employing a descriptive-analytical quantitative approach, data were collected via a structured questionnaire from 400 financial and branch managers, with 334 valid responses analyzed. Statistical analysis using SPSS software and multiple linear regression models was used to test the proposed hypotheses. The findings reveal a significant positive influence of digital FinTechs on banks' financial performance, both directly and indirectly through improved financial soundness, consistent with recent evidence (Baker et al., 2023; Almashhadani & Almashhadani, 2023). These results underscore the strategic importance of strengthening institutional resilience to maximize technology-driven gains. The study contributes a novel applied framework for understanding technology-performance dynamics in emerging markets and offers practical recommendations to guide digital integration while preserving financial stability.

Keywords: Digital Financial Technologies, Electronic Clearing, Electronic Payment Cards, Electronic Wallets, Financial Performance, Financial Soundness, Banking Sector

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1. INTRODUCTION

In recent decades, the world has witnessed an unprecedented surge in technological advancements, leading to a comprehensive digital revolution that has profoundly impacted various aspects of life, particularly in the economic and social spheres (Chaisiripaibool et al., 2025; Firdaus & Tobing, 2022; Rieg & Ulrich, 2024). The financial sector has been significantly influenced by these transformations, with financial technology (FinTech) driving fundamental changes in the delivery of financial services.

However, this digital transformation presents both opportunities and critical challenges, especially for emerging economies like Jordan. Jordanian banks, which serve as a cornerstone of the national financial system, are now under increasing pressure to adapt to these changes. The demand for faster, more personalized, and technology-driven banking

services has become the norm among consumers. At the same time, banks face intense competition, shifting regulatory frameworks, and rising cybersecurity threats — all of which necessitate a reevaluation of their operational and strategic priorities.

While the adoption of digital FinTechs can potentially reduce operational costs, increase customer satisfaction, and enhance overall competitiveness, it also raises fundamental concerns about the financial soundness of banks. Financial soundness — the ability of an institution to meet its obligations and absorb financial shocks — has become a critical factor in determining the long-term sustainability of banks operating in a rapidly evolving digital ecosystem (International Monetary Fund [IMF], 2023; Kirimi et al., 2022). Key elements of soundness, such as liquidity, capital adequacy, and asset quality, must be preserved even as banks aggressively pursue technological innovation.

Recent trends in Jordan's banking sector indicate a deceleration in financial performance, prompting concerns over whether digital FinTechs are being effectively leveraged without compromising institutional stability. There is, therefore, a pressing need to understand not only the direct impact of digital FinTechs on bank performance but also the mediating role of financial soundness in this relationship.

Despite the rapid adoption of digital FinTechs in the banking sector — particularly in emerging economies such as Jordan — there remains a limited understanding of how these technologies affect financial performance beyond their direct impact. Most existing studies overlook the internal institutional factors that may mediate this relationship, resulting in a significant research gap. In particular, the role of financial soundness as a mediating variable in the link between digital FinTechs (such as electronic clearing systems, payment cards, and e-wallets) and bank performance has not been adequately explored.

This study aims to address this pressing issue by examining the influence of key digital FinTech tools — namely, electronic clearing systems, electronic payment cards, and digital wallets — on the financial performance of Jordanian banks. It places particular emphasis on financial soundness as a mediating factor that could enhance or constrain the benefits of digital innovation. Employing a descriptive-analytical methodology and leveraging data collected from financial managers across the banking sector, the study seeks to deliver empirically grounded insights that can guide both policy and practice. Ultimately, the research aims to offer strategic recommendations for optimizing digital adoption while safeguarding financial resilience in Jordan's banking industry.

The paper's structure is as follows. Section 2 reviews the relevant literature and previous studies. Section 3 outlines the methodology. Section 4 describes the research design, data collection methods, and analysis techniques used and presents the results of the hypothesis testing. Section 5 provides a discussion of the findings. Finally, Section 6 offers the conclusions.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Theoretical framework

Financial technology refers to the transformation of traditional financial services into digital solutions, enabling the development of innovative business models through advanced technologies. These innovations contribute to enhancing financial performance by optimizing resource utilization, reducing costs, and increasing returns (Menza et al., 2024). According to researchers, FinTech encompasses a range of innovations that facilitate the transition of financial services from traditional to digital platforms. Key innovations in this field include electronic clearing systems, digital payment services (Kou & Lu, 2025; Jagtiani & Lemieux, 2017), and digital wallets (Al Musawi & Al-Hajjar, 2022; Lee et al., 2021).

The rapid evolution of FinTech has significantly improved banks' competitiveness and profitability in the financial sector (Wang et al., 2021). Some of the most notable advantages of integrating digital FinTechs into banking operations include:

1. The emergence of new business models, such as crowdfunding, enables banks to expand customer engagement while reducing operational expenses (Wang et al., 2021).

2. Lower credit risk through advanced data analytics and automated risk assessment tools (Basdekis et al., 2022).

3. Accelerated banking sector growth driven by increased efficiency and enhanced service accessibility (Carney, 2017; Bouis et al., 2024).

4. Enhanced financial stability at the national level due to reduced cash liquidity in circulation, contributing to a more secure and controlled financial environment (Frederica et al., 2021).

5. Despite these advantages, the implementation of FinTech in the banking sector presents several challenges. A major drawback is the potential rise in unemployment, as automation and digital systems reduce the demand for human labor. Furthermore, without adequate regulatory oversight, cybersecurity threats and data breaches may escalate, posing significant risks to financial institutions and customers (Awale & Kulmie, 2024).

FinTech adoption in banking also faces structural and operational challenges, including high infrastructure costs and a shortage of skilled professionals. Many financial institutions struggle with inadequate technological infrastructure and a lack of trained personnel to effectively implement and manage digital transformation initiatives. Concerns over data security and privacy risks remain significant barriers. Another key issue is technological illiteracy, especially among older generations, which limits the widespread adoption of digital banking services. Moreover, some bank managers and employees resist digital transformation due to their reluctance to learn and adapt to new technologies (Allam, 2021).

From a financial perspective, bank performance is defined as the effective utilization of available resources to maximize profitability while minimizing costs. This includes optimizing financial operations to enhance overall efficiency and revenue generation (Kweh et al., 2024).

2.2. Previous studies

The reviewed literature demonstrates a growing body of research focused on the relationship between digital FinTech and financial performance, as well as between financial soundness and performance. However, most of these studies treat these variables independently, with limited integration or exploration of mediating effects.

2.2.1. Studies on FinTech and financial performance

Studies by Hendawi et al. (2024), Aql et al. (2023), Baker et al. (2023), and Almashhadani and Almashhadani (2023) confirmed the positive impact of FinTech tools — such as automation, alternative payment methods, and financial inclusion — on banking performance in Jordan, Egypt, and the United Arab Emirates (UAE). However, these studies primarily rely on either questionnaire-based surveys or panel data analysis without exploring the structural mechanisms that explain how FinTech contributes to performance beyond direct effects. Recent empirical works further emphasize the evolving digital landscape in banking. For example, Rieg and Ulrich (2024) examined how digital transformation in management accounting and operational planning indirectly supports corporate performance, thereby aligning FinTech advancements with broader financial outcomes. Chaisiripaibool et al. (2025) extended this perspective by analyzing digital asset adoption and associated risks in developing economies, underlining the importance of risk perception in successful FinTech integration. Some literature highlighted how machine learning and data mining are being employed in electronic banking transactions to improve payment efficiency and financial decision-making — tools that have become vital to boosting bank performance in competitive environments.

2.2.2. Contextual limitations and methodological gaps

Several studies, including those by Idrees et al. (2024), Banna et al. (2022), Tang et al. (2020), and Ali et al. (2020), used descriptive or analytical approaches to examine FinTech's role in Islamic and conventional banking systems. While valuable in highlighting conceptual links and offering policy suggestions, these studies lack rigorous empirical models, mediating variables, or robust causal frameworks. Notably, Ali et al. (2020) reported no significant relationship between digital transformation and strategic financial performance — an outlier compared to the broader consensus — suggesting that contextual differences may influence FinTech's effectiveness.

Firdaus and Tobing (2022) reinforced this point by presenting a detailed case study of digital ecosystem risks in digital banking. Their work shows that despite the technological potential, weak regulatory control and insufficient infrastructure may hinder performance gains — highlighting the need to examine mediating factors like financial soundness and institutional resilience.

2.2.3. Financial soundness and performance studies

Research by Saka Ilgin (2024), Salih (2023), and Şit (2022) explored the impact of financial soundness indicators (e.g., capital adequacy, liquidity, asset quality) on financial performance. These studies typically use capital, assets, management, earnings, and liquidity (CAMEL) or risk profile, good corporate governance, earnings, and capital (RGEC) models and panel regression techniques, revealing the strong predictive role of soundness metrics in explaining bank performance. However, they do not consider digital FinTechs as antecedents to soundness, missing the opportunity to explore a sequential model where FinTech adoption enhances soundness, which in turn improves financial performance.

2.2.4. Contribution of the study

This study offers a unique contribution by integrating digital FinTechs and financial performance through the mediating role of financial soundness — an area largely unexplored in previous literature. It fills a significant research gap by revealing how FinTech influences financial performance through mechanisms of financial stability. Conducted within the Jordanian banking sector, the research provides context-specific insights for an under-investigated emerging market. It is methodologically distinct, employing a focused model structure, appropriate variable selection, and a targeted sample of financial managers. These elements enhance the study's depth, reliability, and practical relevance. The study also offers strategic guidance for banks and policymakers on leveraging FinTech to bolster financial soundness and contributes to academic understanding of digital transformation in banking. Ultimately, it supports the strategic alignment of technological adoption with financial objectives, promoting sustainable financial development in Jordan and similar economies.

2.3. Research hypotheses

Based on the theoretical framework and previous empirical findings, this study aims to examine the impact of financial digital technologies on financial soundness and performance in the banking sector. The proposed hypotheses are designed to assess both direct and indirect relationships among the key variables, including the potential moderating role of financial soundness. The constructs investigated include dimensions such as electronic check clearing, electronic payment cards, and electronic wallets, which represent the core components of financial digital technologies. These hypotheses seek to clarify the causal links that may exist among these digital advancements, the stability of banking institutions, and their overall financial performance:

H1: There is no statistically significant effect at the level ($\alpha \leq 0.05$) of financial digital technologies, with its dimensions (electronic check clearing, electronic payment cards, and electronic wallets), on financial soundness in the banking sector.

H2: There is no statistically significant effect at the level ($\alpha \leq 0.05$) of financial soundness on financial performance in the banking sector.

H3: There is no statistically significant effect at the level ($\alpha \leq 0.05$) of financial digital technologies, with its dimensions, on financial performance in the banking sector.

H4: There is no statistically significant effect at the level ($\alpha \leq 0.05$) of financial digital technologies, with its dimensions, on financial performance, considering the moderating role of financial soundness.

3. RESEARCH METHODOLOGY

This study employs a descriptive-analytical research design to investigate the role of digital FinTechs — specifically electronic check clearing (*CL*), electronic payment cards (*PC*), and electronic wallets (*EW*) — in enhancing financial performance, with financial soundness acting as a mediating variable within Jordanian banks.

3.1. Data collection and analysis

Primary data were collected using a structured questionnaire distributed among financial and branch managers in banks operating across Jordan. The responses were used both to describe the study variables and to test the research hypotheses through appropriate statistical methods, including structural equation modeling (SEM).

3.2. Study population and sample

The population consisted of 20 financial managers and 865 branch managers, according to the Association of Banks in Jordan[1]. These professionals operate in performance-driven environments where the use of digital FinTechs directly influences their evaluations and the bank's financial performance.

Due to accessibility constraints, a stratified random sample of 400 participants (approximately 45% of the population) was selected. A total of 334 valid responses were received, resulting in a high response rate of 83.5%, which enhances the statistical power of the study.

3.3. Study tool

The questionnaire was developed based on constructs adapted from validated instruments in recent studies (Hendawi et al., 2024; Basdekis et al., 2022; Almashhadani & Almashhadani, 2023). The tool consisted of four sections aligned with the conceptual model: 1) digital FinTechs, 2) financial soundness, 3) financial performance, and 4) general demographic data.

3.4. Study model

The hypothetical model was constructed based on the study's objectives and literature review. It consists of:

- Independent variable: Financial digital technologies (*FDT*) (three sub-dimensions: *CL*, *PC*, *EW*);
- Mediating variable: Financial soundness (*FS*);
- Dependent variable: Financial performance (*FP*);

A visual depiction of this model is presented in the Appendix.

3.4.1. Validity and reliability

To ensure the instrument's reliability, Cronbach's alpha was calculated. As shown in Table 1, all sub-scales achieved values above 0.70, indicating strong internal consistency, consistent with the threshold proposed by Bougie and Sekaran (2020).

Table 1. Results of the reliability test of the study instrument (Cronbach's alpha)

Domain	*Cronbach's alpha*
FDT	0.709
CL	0.804
PC	0.788
EW	0.772
FS	0.771
FP	0.779
Overall instrument	0.819

3.4.2. Alternative methodological approaches

While a descriptive-analytical design using survey data was appropriate for the scope of this study, several alternative methodologies could have been employed to yield complementary insights:

1. *Qualitative case study approach*: A multiple-case study involving in-depth interviews with banking executives and technology implementation teams could provide a richer context on how *FDT* affects operations and decision-making. This approach would be especially useful for exploring barriers to adoption, managerial perceptions, and institutional readiness in different banking contexts.

2. *Mixed-methods approach*: Combining quantitative surveys with qualitative interviews or focus groups would allow for both broad generalizability and in-depth insight. For instance, while the survey could identify statistically significant patterns, interviews could clarify the reasons behind them and explore unmeasured variables such as organizational culture or employee digital skills.

3. *Time-series or panel data analysis*: If longitudinal *FP* and digital adoption data were available, a time-series econometric model (e.g., linear autoregressive distributed lag [ARDL] or nonlinear autoregressive distributed lag [NARDL]) could be used to test causal and nonlinear relationships over time. This would allow for stronger inferences about temporal precedence and long-term effects of digital transformation.

4. *Experimental or quasi-experimental design*: Although difficult to implement in banking settings, a quasi-experimental design (e.g., comparing performance in banks before and after adopting a specific digital tool) could isolate the impact of that tool on performance metrics. Propensity score matching or difference-in-differences (DiD) approaches could also be employed for more robust causal inference.

4. RESEARCH RESULTS

To analyze the study data and derive meaningful results, the following statistical methods were applied: simple and multiple regression analyses were conducted to evaluate the impact of *FDT* on the performance of the banking sector. Additionally, the study examined the role of *FS* as a mediating factor in this relationship, thereby testing the research hypotheses.

4.1. Sample perceptions of financial digital technologies

As illustrated in Tables 2, 3, and 4, the findings reveal that the sample holds a generally positive perception of *FDT*. The average ratings for this category ranged from 3.1210 to 3.2395, indicating overall agreement with the related statements.

[1] https://abj.org.jo/ar

Table 2. Means and standard deviations for the sample's evaluation of *FDT*

Variable	*Mean*	*Std. dev.*
CL	3.2395	0.82840
PC	3.2251	0.74388
EW	3.1210	0.85191
FDT (Overall)	3.1952	0.64369

Table 3. Means and standard deviations for the sample's evaluation of *FS* in the banking sector

Variable	*Mean*	*Std. dev.*
FS	3.1910	0.80779

Table 4. Means and standard deviations for the sample's evaluation of *FP* in the banking sector

Variable	*Mean*	*Std. dev.*
FP	3.1988	0.79639

4.2. Correlation and collinearity

The researcher conducted tests to ensure that the data met regression analysis. These included verifying the absence of multicollinearity using correlation coefficients, variance inflation factor (VIF), and tolerance tests. Skewness coefficient analysis confirmed normal data distribution, with all values below 1, as shown in Table 5. The tolerance values ranged between 0.584 and 0.699, exceeding the 0.05 threshold, indicating no multicollinearity. Additionally, the skewness coefficients ranged between -0.109 and 0.058, within the acceptable range (less than 1), confirming the normality of the data distribution (Hair et al., 2010).

Table 5. Correlation matrix and collinearity statistics

Variables	*FP*	*CL*	*PC*	*EW*	*FS*	*Skewness*	*Tolerance*	*VIF*
FP	1.000					-0.109		
CL	0.396	1.000				-0.082	0.699	1.430
PC	0.531	0.383	1.000			-0.048	0.694	1.440
EW	0.476	0.506	0.456	1.000		0.007	0.584	1.711
FS	0.542	0.423	0.491	0.550	1.000	0.058	0.611	1.637

4.3. Hypotheses testing results

For *H1*, the analysis confirmed a statistically significant effect ($R^2 = 0.389$, Sig. = 0.000), indicating that 38.9% of the variation in *FS* is explained by the three technologies. Electronic wallets showed the highest impact (T = 6.702), highlighting their growing importance in banking stability (see Table 6).

For *H2*, the findings revealed a significant positive relationship ($R^2 = 0.294$, T = 11.747, Sig. = 0.000), indicating that *FS* explains 29.4% of the variance in *FP* (see Table 7).

For *H3*, the model explains 36.4% of the variation in *FP* ($R^2 = 0.364$), with a significant F-value (62.830). The Durbin-Watson statistic (1.769) confirms no autocorrelation (see Table 8). Thus, the *H3* is rejected.

For *H4*, the model explains 41.2% of the variation in *FP*, with *FS* acting as a significant mediating factor. The Durbin-Watson statistic (1.887) confirms the absence of autocorrelation, and the model is statistically significant (F = 57.589, Sig. = 0.000), supporting the rejection of the *H4* (see Table 9).

Table 6. Impact of *FDT* on *FS*

Variables	*Parameter*	*T*	*R^2*	*Sig.*	*F*	*Durbin-Watson*
Constant	0.738	4.106	0.389	0.000	70.049	1.867
CL	0.134	2.704				
PC	0.301	5.623				
EW	0.336	6.702				

Table 7. Impact of *FS* on *FP*

Variables	*Parameter*	*T*	*R^2*	*Sig.*	*F*	*Durbin-Watson*
Constant	1.494	9.983	0.294	0.000	137.986	1.820
FS	0.534	11.747				

Table 8. Impact of *FDT* on *FP*

Variables	*Parameter*	*T*	*R^2*	*Sig.*	*F*	*Durbin-Watson*
Constant	0.806	4.458	0.364	0.000	62.830	1.769
CL	0.127	2.540				
PC	0.398	7.380				
EW	0.224	4.446				

Table 9. Impact of *FDT* on *FP* with *FS* as a mediating factor

Variables	*Parameter*	*T*	*R^2*	*Sig.*	*F*	*Durbin-Watson*
Constant	0.602	3.371	0.412	0.000	57.589	1.887
CL	0.090	1.844				
PC	0.314	5.786				
EW	0.131	2.533				
FS	0.277	5.197				

5. DISCUSSION

The findings of this study offer significant insights into the evolving role of *FS* in the relationship between *FDT* and the *FP* of Jordanian banks. While the primary analysis positioned *FS* as a mediating variable, the strength and nature of its effects also suggest the possibility of a moderating role, which warrants further theoretical exploration and empirical validation.

The results affirm that *FDT* — especially *EW* — significantly enhances *FS*. The strength of e-wallets in this relationship highlights their value in reducing transaction costs, improving liquidity management, and expanding customer access. These factors collectively contribute to greater institutional resilience and reduced systemic risk. This finding is particularly relevant given the limited prior research directly connecting e-wallet usage to financial soundness metrics.

These findings are further substantiated by recent empirical studies. For instance, Baker et al. (2023) and Aql et al. (2023) underscore the role of *FDT* in enhancing cost efficiency and operational resilience, which are critical components of *FS*. Likewise, Hendawi et al. (2024) confirm that FinTech adoption contributes significantly to liquidity management and financial stability in Jordanian Islamic banks. In the context of external shocks, Banna et al. (2022) show that digital financial inclusion strengthened the stability of banks during crises such as the COVID-19 pandemic — providing indirect yet compelling support for the positive impact of digital technologies on systemic soundness.

However, divergent findings in the literature (Saka Ilgin, 2024; Salih, 2023; Ali et al., 2020) caution that benefits depend on contextual variables — such as cybersecurity readiness, digital maturity, and regulatory infrastructure. These studies suggest that digitalization without sound risk governance may actually undermine stability, underscoring the importance of institutional preparedness.

The *H2* was strongly validated, confirming that *FS* significantly enhances bank performance. This finding aligns with the broader literature (Şit, 2022; Qamruzzaman, 2014), which views financial health as a prerequisite for sustainable growth and profitability.

Yet, some contradictions exist. For example, Saka Ilgin (2024) and Idrees et al. (2024) found no significant link between *FS* and short-term financial returns, highlighting the potential for time-lagged effects or differences based on external macroeconomic variables.

Results from mediation analysis show that *FS* partially mediates the relationship between *FDT* and *FP*. While digital tools have a direct positive impact, their indirect effect through *FS* enhances and stabilizes this impact. This suggests that digitalization's benefits are more durable when financial soundness is also present — acting as an enabler and amplifier.

These findings align with the conclusions of Kirimi et al. (2022), who emphasized that robust financial foundations are essential for maximizing the benefits of digital tools, and Rieg and Ulrich (2024), who demonstrated that strategic financial planning mediates the impact of digitalization on organizational performance. Furthermore, while *FS* was initially treated as a mediating variable, the evidence suggests it may also function as a moderating factor — shaping the strength and effectiveness of the relationship between digital technology adoption and financial performance. In particular, banks with stronger financial positions tend to derive greater value from digital innovations, whereas those with weaker soundness may fail to capitalize fully on technological advancements or may even face heightened financial risks.

For future models, *FS* can be tested as a moderator by introducing interaction terms (*DigitalTech* × *FinancialSoundness*) in regression equations, to statistically verify whether the strength or direction of digital tools' effect on performance differs at varying levels of FS.

This study has certain practical implications:

- Policy design: Regulators should not only promote digital transformation but also strengthen institutional soundness through regulatory buffers and cyber governance frameworks.
- Strategic investment: Banks should prioritize e-wallets and mobile technologies, which demonstrate the highest returns in terms of both customer value and institutional stability.
- Digital readiness assessment: Institutions must assess their FS and operational capacity before implementing large-scale digital projects.

6. CONCLUSION

This study provides robust evidence that financial digital technologies — particularly electronic check clearing, electronic payment cards, and electronic wallets — significantly enhance the financial performance of Jordanian banks. The results also confirm that financial soundness serves not only as a mediating mechanism but potentially as a strategic enabler that amplifies the benefits of digital adoption. Among all technologies studied, electronic wallets emerged as the most impactful, highlighting the strategic importance of customer-centric innovations in modern banking.

Policymakers and bank executives should prioritize the adoption of technologies that demonstrate both performance enhancement and systemic stability. Electronic wallets, with their real-time functionality and widespread usability, should receive focused investment and integration support.

Regulatory authorities, in collaboration with banks, should mandate the inclusion of user education content — such as video guides and tutorials — within digital banking platforms to enhance digital literacy, foster inclusion, and build trust among underserved populations.

Financial institutions should align performance-based incentives with digital innovation targets. This alignment can motivate employees to adopt, utilize, and refine digital tools that contribute to improved service quality and customer experience.

Training programs for both staff and clients can be revolutionized using virtual reality or Metaverse-based platforms, providing interactive and scalable experiences that expedite digital onboarding and reduce resistance to new technologies.

As financial digital technologies evolve, regulatory bodies must update existing frameworks to ensure the safe integration of these tools. This includes revising financial soundness indicators to incorporate digital resilience, cybersecurity infrastructure, and platform reliability as key components of systemic stability.

This study focused on three core technologies and a single mediating variable — financial soundness (*FS*) — within the context of Jordanian banks. While the sample is statistically robust, the findings may not be generalizable to banks in other regions with differing levels of digital maturity, regulatory sophistication, or infrastructure development. Additionally, the use of cross-sectional data limits the ability to establish causal relationships or evaluate long-term effects.

Investigate additional financial digital technologies, including artificial intelligence-powered tools, blockchain applications, and biometric verification systems. Examine alternative mediating and moderating variables, such as organizational culture, digital maturity, and cybersecurity capabilities, to uncover deeper mechanisms driving performance.

Conduct comparative studies across emerging markets to assess contextual variations in the technology-performance relationship.

Employ longitudinal or panel data to evaluate the sustained impact of digital adoption over time and across different business cycles.

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APPENDIX. SURVEY QUESTIONNAIRE

Section 1: General information

Please provide your responses to the following demographic questions:

1. Gender:
   - ○ Male
   - ○ Female

2. Age:
   - ○ 26–35 years old
   - ○ 36–45years old
   - ○ 46 years old and above

3. Educational level:
   - ○ High school
   - ○ Bachelor
   - ○ Master
   - ○ PhD

4. Years of experience in the banking sector:
   - ○ 5 years or less
   - ○ 6–10 years
   - ○ More than 10 years

5. Bank type:
   - ○ Commercial
   - ○ Islamic
   - ○ Other

Section 2: Independent variable – financial digital technologies

Please indicate your level of agreement with the following statements on a scale of 1 (strongly disagree) to 5 (strongly agree).

No.	*Statement*	*Strongly disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
	Dimension 1. Electronic clearing (e-clearing)					
1	Electronic clearing speeds up the settlement process of transactions.					
2	Electronic clearing reduces the chances of human errors in banking transactions.					
3	The implementation of e-clearing has improved customer satisfaction.					
4	Electronic clearing enhances transparency in financial transactions.					
5	The bank has a well-established electronic clearing system.					
	Dimension 2. Electronic payment cards					
6	The use of electronic payment cards has reduced the reliance on cash transactions.					
7	Customers prefer using electronic payment cards for secure transactions.					
8	Electronic payment cards help in tracking and managing financial expenses effectively.					
9	The bank provides sufficient security measures to protect card transactions.					
10	The bank continuously upgrades its electronic payment card services.					
	Dimension 3. Electronic wallets					
11	The adoption of electronic wallets has increased customer convenience.					
12	Electronic wallets offer a secure and efficient alternative to traditional payments.					
13	The bank promotes the use of electronic wallets through incentives and offers.					
14	Electronic wallet transactions are faster compared to other payment methods.					
15	The security measures of electronic wallets are reliable.					

Section 3. Mediating variable — Financial soundness

No.	*Statement*	*Strongly disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
16	The adoption of electronic financial services enhances the financial stability of banks.					
17	The bank ensures regulatory compliance in all electronic financial transactions.					
18	Risk management strategies are well implemented for electronic financial transactions.					
19	Electronic financial services reduce fraud and unauthorized transactions.					
20	The reliability of electronic financial transactions improves banking operations.					
21	The bank invests in cybersquatting to protect electronic financial transactions.					
22	Employees are well-trained to handle electronic financial transactions securely.					
23	Customers trust the soundness of electronic banking services provided by the bank.					
24	The adoption of electronic financial services enhances the financial stability of banks.					
25	The bank ensures regulatory compliance in all electronic financial transactions.					

Section 4. Dependent variable — Financial performance in the banking sector

No.	*Statement*	*Strongly disagree*	*Disagree*	*Neutral*	*Agree*	*Strongly agree*
26	Electronic financial transactions contribute to increased profitability for banks.					
27	The adoption of electronic financial services has enhanced operational efficiency.					
28	Banks that use electronic financial transactions experience lower operational costs.					
29	Customer retention has improved due to the availability of electronic financial services.					
30	Electronic financial services have led to a higher volume of banking transactions.					
31	The adoption of electronic financial transactions has increased the bank's competitive advantage.					
32	The bank has experienced a significant increase in revenue due to electronic transactions.					
33	The financial performance of the bank has improved due to the use of electronic banking services.					
34	Electronic banking has reduced the cost of handling cash transactions.					
35	The overall financial stability of the bank has improved due to electronic financial services.					