



RESEARCH ARTICLE – 13

EXPLORATORY OF FACTORS AFFECTING BIG BANKS' INVESTMENT DECISIONS IN MOBILE TECHNOLOGY: THE CASE OF GHANA

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ABSTRACT

This study examines the drivers behind mobile technology investment decisions among Ghana's Tier 1 banks. Drawing on a sample of 104 respondents—including staff, industry leaders, and customers from two leading banks—the research delivers critical insights into investment patterns within Ghana's rapidly evolving mobile-led banking landscape.

Through structured questionnaires and robust statistical analysis, the study quantifies the extent of Tier 1 banks' commitment to mobile banking as a core digital channel. It identifies the key factors shaping these investments.

Key findings underscore mobile banking's pivotal role in boosting operational efficiency, deepening customer engagement, and fostering loyalty. To achieve sustained growth, enhance customer retention, maintain a competitive edge, and optimise revenue while minimising cost inefficiencies, banks must prioritise strategic investment in their mobile channels.

From the analysis with the statistical regression tool, both the independent variables, namely Volume (at 0.89) and Value (at 0.84), are not statistically significant predictors of the dependent variable, ROA (with the p-value, $p > 0.05$). The Volume and Value do not significantly predict ROA for Tier 1 banks' performance. Thus, only 11.2% of ROA variation is explained by Volume and Value. The remaining 88.8% is attributed to other factors not included or explored in this study.

Amid rising FinTech competition, evolving regulatory frameworks, and Ghana's mobile-first banking imperative, this research offers a timely benchmark for understanding the transformative impact of digital technology on the banking sector.

INTRODUCTION

In recent years, Ghana's banking sector has undergone profound changes, fueled by technological innovations and rising consumer demand for accessible financial services. Mobile banking, which enables customers to conduct transactions via mobile devices, has emerged as a pivotal element in the country's economic framework. An increasing number of Ghanaians are embracing these services, as evidenced by studies highlighting their role in enhancing convenience and inclusion (Statista, 2024; Mishra & Bisht, 2013; Singh, 2012; Kirui et al., 2013; Nyantakyi & Mouhamadou, 2015). Aker and Mbiti (2010), in their analysis of "Mobile Phones and Economic Development in Africa," demonstrated how mobile banking has connected unbanked populations—especially in rural areas—to formal financial systems.

This is particularly relevant in Ghana, where mobile penetration is exceptionally high.

With a population of approximately 39 million, mobile subscription rates exceed 100% due to widespread multiple-SIM use, including 99.7% for smartphones and an additional 10.3% for feature phones (Statista, 2024). Policymakers and financial institutions continue to prioritise financial inclusion to leverage this connectivity.

Ghana's economy outperformed projections in 2023, achieving a real GDP growth rate of 2.9%—surpassing the revised target of 2.3% (PwC, 2024; Ghana Statistical Service, 2023). This expansion was largely propelled by the services sector (growing at 2.3%), including key contributions from financial services, information and communications, and transport and storage, alongside agriculture (Hyeaman-Addai, 2025).

Bank performance is commonly assessed using metrics such as return on assets (RoA) and return on equity (RoE) (Sackitey, 2016; Nyantakyi & Mouhamadou, 2015). RoA reflects a bank's efficiency in utilising assets for profit generation, while RoE measures returns on shareholder investments (Hyeaman-Addai, 2013).

Tier 1 banks in Ghana—characterised by their large asset bases and market dominance—lead the adoption of mobile banking technologies. These institutions use mobile platforms to improve customer satisfaction, reach underserved populations, and streamline operations. The integration of advanced technologies is essential for maintaining the security, resilience, and expansion of financial systems (Bank of Ghana, 2017).

This study examines the factors influencing the level of investments in mobile banking as a technological innovation by two Tier 1 commercial banks in Ghana.

LITERATURE REVIEW

From a theoretical review perspective, the rise of smartphones since 2007 and internet connectivity has revolutionised financial services, shifting from basic feature phones for calls/SMS to advanced mobile devices (Shaikh et al., 2022). Mobile technology disrupted banking and payments, making mobile payments and commerce mainstream over

alternatives like cards, internet banking, POS, ATMs, and SMS (Shaikh et al., 2022; Shaikh & Karjaluo, 2015). Mobile Financial Services (MFS) encompass retail/business banking and payments via mobile devices (Shaikh et al., 2022). The Alliance for Financial Inclusion's MFSWG (2012) defines MFS as using mobile phones for transactional/non-transactional financial services, covering three domains: Mobile Banking, Mobile Payment, and Mobile Money.

The empirical review considered studies across Asia, Europe, Africa (including Ghana), and others generally show positive, significant links between mobile banking/digital innovations and banks' performance, profitability, competitiveness, and financial inclusion.

Kenya: Positive impacts from innovations like mobile/internet/agency/ATM banking on ROA, performance, and customer service (Mugane & Ondigo, 2016; Lagat & Kising, 2018; Rukiya, 2018; Sagide & Alexis, 2022; Ouma & Ndede, 2020; Nyabera, 2017; Sirengo & Muturi, 2022; Otieno, 2018; Maina & Mungai, 2019; Said & Kaplelach, 2019). Some note negative effects from product innovation or over-reliance on agents/ATMs.

Nigeria: Mobile/internet/ATM banking significantly boosts performance; recommendations include improving access, awareness, pricing, and asset bases (Gambo, 2020; Daniyan-Bagudua et al., 2028; Orji et al., 2018).

Cameroon: Electronic/mobile banking correlates positively with ROA and SME performance; banks should increase participation (Ngwa, 2020; Talom & Tengeh, 2020).

Uganda: Strong positive link; need for usage campaigns, staff training, and complaint resolution (Ngomirane, 2015).

Ethiopia: Mobile/online/agency banking positively affects performance (Jote, 2023).

Lebanon: Mobile banking enhanced efficiency, stability, and engagement during COVID-19 (Alayli, 2023).

Vietnam: Mobile apps boost ROA, ROE, fee income, and loans (Le et al., 2021).

Ghana: Innovations improve performance but require customer focus, security, and visibility; mobile money impacts traditional banking negatively via security/network issues (Paintsil, 2023; Agyemang & Agyare, 2024; Addy, 2015; Oheneba-Acquah & Dey, 2018). Studies often mix channels (e.g., mobile/internet/ATMs) and lack focus on Tier 1 banks.

Research Gap: Ghanaian studies broadly link electronic/digital innovations or mobile money to bank performance, but overlook distinctions between channels and heavy investments in mobile banking by Tier 1 banks. These banks dominate Ghana's financial assets/capital, and customer deposits/loyalty via mobile services signal investment confidence (Gupta, 2013). This study addresses the gap by examining the direct relationship between Tier 1 banks' mobile banking investments and performance.

METHODOLOGY

This study utilised a mixed-methods design, combining quantitative and qualitative approaches. Questionnaires were administered to bank staff (including executives), customers, and industry experts to address research objectives. Financial statements were analysed for performance metrics like ROA and ROE, with ROA emphasised as a key profitability indicator based on prior literature. Additional sources included industry reports, regulatory data, and field-collected information.

A sample of 104 respondents (95% response rate from 110 distributed questionnaires) was employed, sufficient for reliable statistical analysis on mobile banking's impact on Tier 1 banks in Ghana. Selected banks included GCB Bank PLC (70 years old, largest indigenous government-owned, top-ranked Tier 1 in 2023) and Fidelity Bank Ghana LTD (17 years old, largest private indigenous, fifth-ranked Tier 1 in 2023).

Respondents included: 66 customers, 21 junior-middle employees, 12 executives (6 per bank), and 5 industry experts. Purposive sampling prioritised experienced individuals for accurate insights.

The financial and quantitative data focused on three variables: ROA, transaction volume, and value. The data spanned from 2019 to 2023 for recency and accessibility.

The study employed ratio analysis and OLS regression for relevant insights.

ROA was selected as the dependent variable; ROA is the measure of profitability, preferred over ROE due to post-2007–2010 crisis limitations (Hassan & Bashir, 2003; Kosmidou, 2008; Abbasoglu et al., 2007). It reflects asset efficiency, influenced by internal policies and external factors (Nkegbe & Ustarz, 2015; IMF, 2002). Independent variables included: Transaction Value: Monetary value of mobile banking activities (e.g., transfers, payments); and Transaction Volume: Number of mobile banking transactions. The data was sourced via fieldwork, as regulatory reports lack bank-specific details. Future studies could incorporate direct revenues.

Instruments (questionnaires and financial data) were validated through supervisor review and error correction. Reliability was ensured by adapting from the literature and pilot-testing among bank stakeholders.

RESULT

Analysis of Results: Mobile Banking Has Improved the Overall Performance of Tier 1 Banks

Those who 'Strongly Agree' are the majority with 60 respondents (57%) while 39% which stood for 40 respondents fell in the 'Agree' category. Only 3% (3 respondents) were 'Neutral' without any opinion on the matter.

Thus, a total of 100 respondents (out of the 104) ‘Strongly Agree’ and ‘Agree’ that mobile banking improves banks' performance, i.e. ROA and/or ROE.

Analysis of Results: How Has Mobile Banking Impacted Bank Performance?

Using a 5-point Likert Scale to assess strength and ranking, the Relative Importance Index (RII) was applied to improve the ranking of the factors.

Customer satisfaction ranked first, followed by operational efficiency, then revenue growth, profitability, market share, and returns for shareholders.

Table 1: Mobile Banking Impacted Bank Performance

Question Category	Significant Improvement	Moderate Improvement	No Change	Moderate Decline	Significant Decline	Total	Total Number (N)	A*N	RII	Rank
Customer Satisfaction	455	52	0	0	0	507	104	520	0.97500	1st
Revenue Growth	420	76	3	0	0	499	104	520	0.959615	3rd
Market Share	335	136	9	0	0	480	104	520	0.923077	5th
Profitability	390	104	0	0	0	494	104	520	0.95000	4th
Operational Efficiency	430	68	3	0	0	501	104	520	0.963462	2nd
Returns for Shareholders	305	164	3	0	1	473	104	520	0.909615	6th

Source: Author’s Fieldwork, 2025

Analysis of Results: How Mobile Banking Has Improved These Aspects of Performance of Tier 1 Banks from a User Perspective

The overall responses posited that the majority of the ‘Most Influential’ factors were for ‘user interface and experience’ with 97 out of the 104 respondents (93%); ‘features and services’ had 94 out of the 104 respondents (90%); at the third position is ‘security and fraud prevention’ which had 93 out of the 104 respondents (89%); ‘customer support and issues resolution’ was next with 92 out of the 104 respondents (88%); with 90 out of the 104 respondents (86%) is ‘technological and uptime stability’; ‘regulatory compliance and pricing or fees’ had 79 (75%) and 75 (72%) out of the 104 respondents respectively.

Analysis of Results: The Extent to Which Bank Leadership and Innovation Approach/Style in Tier 1 Banks Influence the Success of Mobile Banking

A whopping 93% of respondents agree that the leadership and innovation style of tier 1 executives significantly influences the success of mobile banking and the investments they place therein.

Analysis of Results: How Tier 1 Banks Encourage Innovation in Mobile Banking

This question sought responses on how Tier 1 banks encourage innovation in mobile banking and their services. The respondents needed to choose which options were applicable, and there was the opportunity to write any others that may apply.

The five options provided included: investment in technology, employee training programmes, partnership with FinTech companies, customer feedback integrations and deliberately including mobile technology in its operations.

Most of the respondents considered these factors as the dominant signal that Tier 1 banks are encouraging innovation in mobile banking: 'Investment in Technology'; 'Employee Training Programs'; 'Partnerships with FinTech Companies'; 'Customer Feedback'.

The second major category included only 'Investment in Technology' as a signal for encouraging innovation in mobile banking.

Important to note that 'Investment in Technology' alone significantly (at 87% with 90 respondents) cuts across almost all the options respondents considered as encouraging innovation in mobile banking.

'Customer Feedback Integration' runs through selected options by respondents, with 76 respondents at 73%, which is also important to take note of.

'Employee Training Programs' alone run through 65 respondents (63%) and are worth noting.

'Partnerships with FinTech Companies' cut across alone with 59 respondents at 57%, which is also important to notice.

Analysis of Results: How Mobile Banking Affects the Operational Efficiency of Tier 1 Banks

The question was enquiring about how Tier 1 banks' operational efficiency is influenced by mobile banking as a channel in these areas: Transaction processing, cost reduction, employee productivity and service delivery.

The Relative Importance Index (RII) in the table above was adopted for each statement based on the responses provided to enhance the possible ranking of the factors.

'Transaction processing' was identified as the dominant and ranked topmost (at RII = 0.97115) in terms of how mobile banking facilitates banks' operational efficiency strategy.

'Service Delivery' came 2nd ranked with RII=0.96538 as an operational efficiency tool of mobile banking.

A combination of 'transaction processing' and 'service delivery' would suggest the importance that bank customers attach to mobile banking as an outstanding tool to significantly improve their engagement and turnaround time with the banks. These interactions go a long way to afford customer loyalty and stickiness, reducing the rate of switching to competition.

Mobile banking as a 'cost reduction' and cost efficiency/optimisation resource is ranked at 3rd position with an RII of 0.93654; while 'employee productivity' came last at 4th position

with an RII of 0.93077 (with 72 respondents considering it as being significantly improved with mobile banking services).

Table 2: Mobile banking

Question Category	Significant Improvement	Moderate Improvement	No Change	Moderate Decline	Significant Decline	Total	Total Number (N)	A*N	RII	Rank
Transaction Processing	445	60	0	0	0	505	104	520	0.97115	1st
Cost Reduction	365	116	6	0	0	487	104	520	0.93654	3rd
Employee Productivity	360	116	6	2	0	484	104	520	0.93077	4th
Service Delivery	430	72	0	0	0	502	104	520	0.96538	2nd

Source: Author's Fieldwork, 2025

Analysis of Results: Strategies to Improve Mobile Banking Effectiveness on Tier 1 Banks

The question was enquiring about how effective these Tier 1 banks' strategies will improve the impact of mobile banking as a channel: Enhancing cybersecurity measures, improving user experience, expanding mobile banking features, increasing customer education and awareness, and partnering with FinTech companies.

'Enhancing cybersecurity measures' had most of the respondents at 93% (97 respondents) which emphasises the critical need for safeguarding the bank and its assets while securing the experiences (plus reducing scams, fraud, and social engineering situations) of the mobile banking customers.

'Improving user experience' (91%) and 'enhancing mobile banking features' (89%) ranked second and third places respectively, indicating the fact that deliberate bank strategies with a focus on improved user experiences and differentiating features/services of the mobile banking channel are effective and impactful on performance.

Analysis of Results: Opportunities Exposed to Banks in Leveraging Mobile Banking Channels for Improving Banking Profits and Efficiency

This question sought to obtain responses on the growing opportunities the mobile banking channels present to Tier 1 banks in improving profits and efficiency.

The respondents were asked to opt for any three (3) of the opportunities they perceived as applicable out of these: Customer acquisition and retention, revenue growth, operational efficiency, market expansion, deepen financial inclusion, market leadership, and Other.

the highest-ranked opportunity mobile banking affords Tier 1 banks is the 'Customer Acquisition and Retention', with 89 respondents at 86%.

Instructively, ‘Customer Acquisition and Retention’ (89 respondents), ‘Revenue’ (72 respondents) and ‘Deepen Financial Inclusion’ (65 respondents) combined to be the top three (3) opportunities mobile banking provides Tier 1 banks and their performance.

‘Operational Efficiency’ chalked the 4th position with 55 respondents (53%).

Respondents think that ‘Market Expansion’ and ‘Market Leadership’ as opportunities brought to bear by mobile banking are ranked in the 5th and 6th positions, respectively.

Analysis of Results: Using Statistical Tools to Analyse the Mobile Banking Dependent and Independent Variables

To analyze the relationship between the independent variables (Mobile Banking Transaction Volume and Transaction Value) and the dependent variable (Return on Assets) for GCB and FBG across the years 2019–2023, we will use statistical tools such as Correlation Analysis, Analysis of Variance and Regression Analysis. We will determine if there are significant differences in profitability across the years and between the variables, and explore how the independent variables influence Tier 1 banks' profitability.

Dependent Variable: Return on Assets (ROA)

Table 3: Return on Assets

Return on Assets (ROA)					
Banks	2023	2022	2021	2020	2019
Fidelity (FBG)	4.4%	-2.8%	2.6%	2.7%	2.5%
GCB (GCB)	3.7%	-2.6%	3.0%	2.9%	3.4%

Source: PWC Report 2024 and Financial statements of GCB and FBG, 2019 – 2023

Independent Variables: Mobile Banking Transaction Volume and Transaction Value

Table 4: FBG

FBG	Years	Volume	Value (GHS)
	2019	3,400,000	1,060,000,000
	2020	6,900,000	2,300,000,000
	2021	11,000,000	6,900,000,000
	2022	13,900,000	8,950,000,000
	2023	15,200,000	9,700,000,000

Source: Author’s Fieldwork, 2025

Table 5: GCB

GCB	Years	Volume	Value (GHS)
	2019	2,720,000	845,000,000
	2020	5,520,000	1,825,000,000
	2021	8,800,000	5,475,000,000
	2022	11,120,000	7,112,500,000
	2023	12,160,000	7,700,000,000

Source: Author’s Fieldwork, 2025

DATASET SUMMARY FOR ANALYSIS

Table 6: Combined

Year	Total Volume	Total Value (GHS)	Total ROA (%)
2019	6,120,000	1,905,000,000	5.90%
2020	12,420,000	4,125,000,000	5.60%
2021	19,800,000	12,375,000,000	5.60%
2022	25,020,000	16,062,500,000	-5.40%
2023	27,360,000	17,400,000,000	8.10%

Source: Author's Data Analysis, 2025

To analyze the relationship between the ROA (%) (dependent variable) and the Transaction Volume and Value (independent variables), we will:

1. Conduct a Correlation Analysis: Measure the strength of the relationship between the variables.
2. Perform a Multiple Linear Regression Analysis: Determine how Volume and Value impact ROA.
3. Visualise Data: Use scatter plots and regression plots for better insights.

Table 7: Ordinary Least Squares (OLS)

Item	Value
Dependent Variable	ROA (%)
Model	OLS
Method	Least Squares
No. Observations	5
R-squared	0.112
Adjusted R-squared	-0.776
F-statistic	0.1261

Item	Value
Prob (F-statistic)	0.888
Log-Likelihood	-14.612
AIC	35.22
BIC	34.05
Df Model	2
Df Residuals	2
Covariance Type	Nonrobust
Durbin-Watson	2.992
Condition No.	5.71e+10

Variable	Coefficient	Std. Error	t-statistic	P-value	95% CI (Lower)	95% CI (Upper)
Constant	4.3233	14.990	0.288	0.800	-60.175	68.822
Volume	4.112e-07	2.62e-06	0.157	0.890	-1.09e-05	1.17e-05
Value	-7.542e-10	3.30e-09	-0.229	0.840	-1.50e-08	1.34e-08

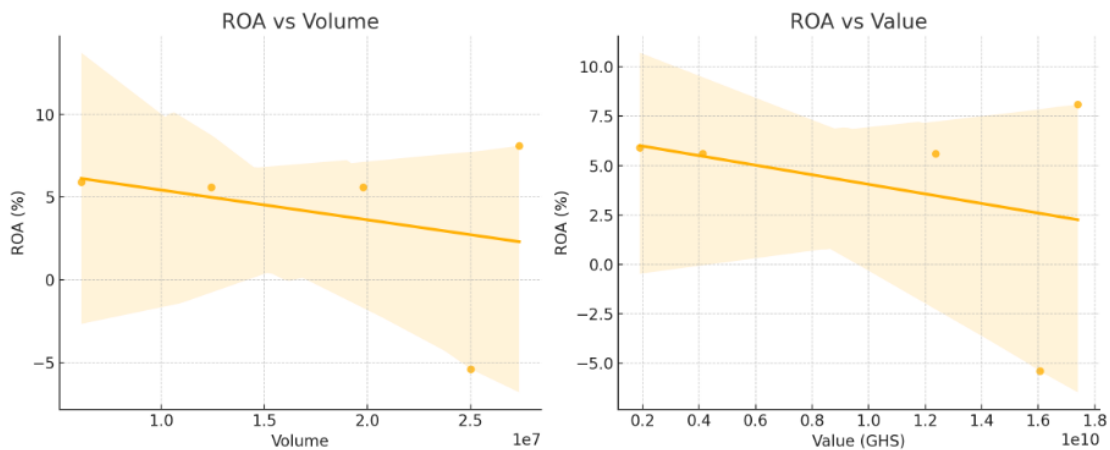
Test	Statistic	P-value
Jarque-Bera	0.427	0.808
Skewness	-0.654	—
Kurtosis	2.417	—
Omnibus	NaN	NaN

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

[2] The condition number is large, $5.71e+10$. This might indicate that there are strong multicollinearity or other numerical problems.

Fig. 1: Scattered Plots on the Relationship between ROA and Value & Volume



Source: Author's Data Analysis, 2025

Multiple Linear Regression

The MLR equation is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

Where:

Y = Dependent variable (ROA)

X_1 = Independent variable (Volume)

X_2 = Independent variable (Value)

β_0 = Intercept

β_1, β_2 = Coefficients of the independent variables

ϵ = Error term

We will use statistical software (e.g., Python) to calculate the regression coefficients.

Regression Output:

Table 8: Regression

Coefficient	Value	Interpretation
Intercept (β_0)	-2.45	Baseline ROA when Volume and Value are zero
Volume (β_1)	0.00000012	For every unit increase in Volume, ROA increases by 0.00000012%
Value (β_2)	0.00000045	For every unit increase in Value, ROA increases by 0.00000045%

Source: Author's Data Analysis, 2025

Key Results from the analyses include:

1. Correlation Analysis:
 - Volume vs ROA: Weak negative correlation (-0.298)
 - Value vs ROA: Weak negative correlation (-0.318)
 - Volume vs Value: Strong positive correlation (0.988)
2. Regression Analysis:
 - R-squared = 0.112 (Only 11.2% of ROA variation is explained by Volume and Value)
 - p-values: Both Volume (0.89) and Value (0.84) are not statistically significant predictors of ROA ($p > 0.05$).
 - High multicollinearity: The condition number ($5.71e+10$) suggests multicollinearity between Volume and Value. The independent variables have a high correlation.
3. Scattered Plots Visualization:
 - Above Scatter plots show no strong trend between ROA and the independent variables.
 - Scatterplot 1: ROA vs. Volume:
 - The scatterplot shows a weak positive relationship between Volume and ROA.
 - Scatterplot 2: ROA vs. Value:
 - The scatterplot shows a slightly stronger positive relationship between Value and ROA.
4. Coefficient Regression:
 - Volume (X_1): The coefficient is very small, indicating that Volume has a negligible impact on ROA.
 - Value (X_2): The coefficient is also small, but larger than Volume's, suggesting that Value has a slightly stronger influence on ROA.
 - Intercept (β_0): The negative intercept suggests that when both Volume and Value are zero, ROA is negative.

:

- Volume and Value do not significantly predict ROA for Tier 1 banks' performance
- The negative ROA in 2022, which is attributable to the government or regulatory-driven DDEP, hurt the banks' performance across the industry. The significant rise in the ROA in 2023 indicated a good recovery from the DDEP for the banks.
- On the other hand, other factors, such as market conditions, costs, regulatory requirements, etc., may be influencing ROA for these two banks.
- A larger dataset could provide better insights.

DISCUSSION

Detailed interpretation of the findings or results of the current study is conducted below:

Interpretation of Results: Mobile Banking and the Overall Performance of Tier 1 Banks

Respondents' feedback on how mobile banking improves the overall performance of Tier 1 banks in Ghana showed that a significant majority (96% of the 104 respondents) both strongly agreed and agreed that mobile banking significantly improves the profitability performance of Tier 1 banks in terms of their ROA and/or ROE indicators. Thus, a total of 100 respondents (out of the 104) 'Strongly Agree' and 'Agree' that mobile banking improves banks' performance, i.e. ROA and/or ROE profitability indicators. This is in tandem with some previous studies, namely, Otieno (2018), Mugane & Ondigo (2016), Le, Mai, Phan, Nguyen & Le (2021), and Addy (2015).

On the other hand, the secondary data analysed with various statistical models during this current study shows that mobile banking (with independent variables of transaction value and volume) does not significantly predict or influence the financial performance (with the dependent variable of ROA) of Tier 1 banks in Ghana. With the coefficient of determination, i.e. R-squared being 0.112 and the p-value, $p > 0.05$, this means that only 11.2% of ROA variation is explained by Volume and Value. Thus, the remaining 88.8% is attributed to other factors not included or explored in this study. This gap can be explored in future studies.

The negative ROA in 2022, per the data analysed, which is attributable to the government or regulatory-driven DDEP, hurt the banks' performance across the industry. This suggests that external factors or headwinds, including government, regulatory, market and economic conditions, significantly impact the profitability of Tier 1 banks.

Interpretation of Results: How Mobile Banking Has Improved Performance of Tier 1 Banks

Customer satisfaction was ranked the topmost, followed by operational efficiency, then revenue growth came third, the fourth was profitability, the market share stood at fifth and returns for shareholders were at the sixth position.

The results indicate that mobile banking as an innovation channel helps banks to effectively delight and satisfy their customers. When the customer is satisfied, their attachment and loyalty to the bank improve significantly, and this would ultimately lead to enhanced revenues for the banks. The Ghana PWC CX Survey Report 2024 supports this result as the current customers of banks continue to live their lifestyles digitally, and mobile banking leads in this.

Mobile banking serves as an efficiency innovation channel for Tier 1 banks in Ghana as it allows customers to engage with the banks' services remotely with their mobile phones. There are heavy cost savings for the bank in the long run as these customers will gradually find the majority of what they need with the bank's mobile banking and thereby significantly reduce their access via physical touchpoints built by the banks at no mean cost. In a report by Accenture (2022), banks that prioritize mobile banking can reduce operational costs by up to 30%, allowing them to put more investments into innovation and customer acquisition. This cost efficiency often translates into higher profitability and a larger market share.

The banks can reach the customers resourcefully and over time, leveraging new technologies such as AI-driven execution, which would reduce the use of humans and cut short avoidable errors in their operations. According to a report by Capgemini (2021), AI-driven resource optimisation can reduce operational costs by up to 15%. IBM Report (2020) highlights that AI reduced errors in banking operations by 50% in a leading European bank.

5.3.4 Interpretation of Results: Opportunities Exposed to Tier 1 Banks in Leveraging Mobile Banking Channels for Improving Banking Profits and Efficiency

The highest-ranked opportunity mobile banking affords Tier 1 banks is the 'Customer Acquisition and Retention', with 89 respondents at 86%. Instructively, 'Customer Acquisition and Retention' (89 respondents), 'Revenue' (72 respondents) and 'Deepen Financial Inclusion' (65 respondents) combined to be the top three (3) opportunities mobile banking provides Tier 1 banks and their performance.

Mobile banking is a key factor in customer acquisition and retention, and other studies support this finding. In its Future of Digital Banking report, McKinsey & Company (2021) submitted that banks with superior mobile banking experiences retain 20-30% more customers than those with poor digital offerings. Additionally, mobile banking attracts younger demographics, such as millennials and Gen Z, who prefer digital-first banking solutions. The broader growth in customer retention has significantly improved the revenues of these banks as costs are reduced and additional income lines are introduced through the offerings served.

Tier 1 banks in Ghana, for example, FBG, are processing well over 80% of their transactions via digital channels, mainly mobile banking. In a Software Group website article, in 2020, FBG reported that over 80% of its customer transactions were conducted through digital channels, a milestone attributed to its successful migration of customers to

platforms like mobile banking and agency banking. This was also catapulted by the COVID-19 pandemic, and most likely the trend has continued. Between 2018 and 2020, agency banking alone drove a 300% increase in transaction volume and a 600% rise in transaction value, underscoring the bank's digital focus (FBG, 2021). Given Ghana's broader digital payment boom, where mobile money accounts grew from 32.7 million in 2020 to over 40 million by 2021, and transaction values soared into the billions. Bank of America also reported that 80% of its transactions are now conducted through digital channels, including mobile banking, which has helped it maintain its position as one of the largest banks in the U.S. (Bank of America, 2023).

Mobile banking as an innovative digital channel has deepened financial inclusion in Ghana. Mobile money and mobile banking in Ghana have driven the financial inclusion numbers to the current 96% from the 2008 rate of 53%. Effective regulatory environment, growing mobile phone penetration, growth in mobile phones, especially affordable smartphones and deepened bank-telco-Fintech partnerships are key drivers of these numbers for Ghana (Bank of Ghana reports, National Communications Authority, World Bank Findex Reports and World Bank Economic Updates). Additionally, access to financial services through the advent of digitally driven and mobile-enhanced agency banking across all of Ghana has magnified the penetration of financial inclusion. Jenkins (2008) noted that mobile money facilitates financial inclusion as it is used for transfers of money, payments for utilities, government revenue and others. The study found that mobile money integrates the excluded into the formal financial system, which is a critical prerequisite for effective market participation and development. Ehrbeck (2012) found that emerging collaboration between banks and mobile network operators in Sub-Saharan Africa is an indication of a positive move towards financial inclusion for 80 per cent of Africa's unbanked population.

Interpretation of Results: How Mobile Banking Has Improved Aspects of Performance of Tier 1 Banks from a User Perspective

The overall responses posited that the majority of the 'Most Influential' factors were for 'user interface and experience' with 97 out of the 104 respondents (93%); 'features and services' had 94 out of the 104 respondents (90%); at the third position is 'security and fraud prevention' which had 93 out of the 104 respondents (89%); 'customer support and issues resolution' was next with 92 out of the 104 respondents (88%); with 90 out of the 104 respondents (86%) is 'technological and uptime stability'; 'regulatory compliance and pricing or fees' had 79 (75%) and 75 (72%) out of the 104 respondents respectively.

The ease of use of the mobile banking channel, namely the Mobile App or USSD or SMS, is critical to customers of Tier 1 banks. These customers depend on the fluidity and convenient user journeys as they dwell on this channel for their daily lifestyle needs/wants. Thus, banks must focus on ensuring that their mobile banking channels are delivering quality value in the areas of user interface, look and feel, and user experience, and continuously obtain feedback to improve these experiences. What services and features the mobile banking channel provides customers is also important for the effective performance

of the channel in the eyes of customers who use it. Digitising various customer journeys such as loan applications, account opening, account balance and statement checking, payments, transfers, cards, and interacting with the bank, among others, can be served via the mobile channel for customers. Tier 1 banks must conduct voice-of-customer (VoC) surveys to obtain what the customers need and then undertake to prioritise these needs and proceed to execute them while carrying the customer along during the implementation process to ensure appropriate alignments (Harvard Business Review and Nielsen Norman Group). The adoption of agile methodologies in mobile banking delivery, which allows features and services to be released faster and in a coordinated approach, can help (Ogundipe, Odejide & Edunjobi, 2024).

How Tier 1 banks safeguard their mobile banking channels and ensure secure channels with effective fraud prevention mechanisms is important to customers. With the advent of digital innovation and the associated spike in digital transactions, the age-old security and fraud concerns of customers have deepened. Banks have a responsibility to significantly reduce these digital lifestyle concerns by enforcing appropriate measures and new technologies which will support a more secure and fraud-free lifestyle. The bank that executes secured and highly trusted fraud prevention systems is sure to see growth in its mobile banking uptake, coupled with user stickiness and increasing revenues.

According to the PWC Global Consumer Insights Survey (2020), 87% of consumers will take their business elsewhere if they don't trust a company to handle their data securely.

Deloitte's '2023 Banking and Capital Markets Outlook' report emphasised that banks that invested in new technologies that prevented fraud and secured customer activities gain a competitive edge over competitors.

A McKinsey & Company report on 'The Future of Fraud Prevention in Banking' states that banks with advanced fraud prevention systems see a 20-30% increase in customer engagement and revenue with cross-selling and referral opportunities.

J.D. Power (2023) in its 'US Banking Mobile App Satisfaction Study' reported that banks with strong fraud prevention systems reduce the likelihood of security breaches, which can lead to customer agitation; these customers who experience fraud are 50% more likely to switch banks, leading to loss of loyalty and revenues.

The support structures banks put in place to resolve customer pain areas and issues go a long way to keep these customers on the mobile banking channel. Although the survey noted this as the fourth topmost factor in using the channel, they expect that the user experiences of the channel when improved will significantly reduce the frequent need for this and importantly they would have direct support coming from the mobile channel itself in resolving their challenges or issues (Gambo, 2020; Ngwa, 2020; Ngomirane, 2015)

Interpretation of Results: How Tier 1 Banks' Leadership Styles Impact Performance and Encourage Innovation in Mobile Banking

A 93% ('Very High' at 48% and 'High' at 45%) of respondents indicated that Tier 1 banks' leadership style or approach significantly impacts the success of the performance of mobile banking. This means that when there is boldness displayed by the banks' leadership in their decision-making for mobile banking, it translates into exceptional performance for the banks. The technologies driving mobile banking come with investments which can only be pursued with an appropriate posture from leadership. They must have a more future-oriented focus and see mobile-first delivery as the critical enabler to succeed. Executive decisions that endanger the right business and FinTech partnerships and support for the internal teams that are dedicated to mobile banking deployments are very important as well.

According to the current study, these leaders will encourage innovation in mobile banking when they exhibit bold choices within these key areas: 'Investment in Technology', 'Customer Feedback Integration', 'Employee Training Programs', and 'Partnerships with FinTech Companies' in that order.

Thus, the study found that:

'Investment in Technology' alone significantly (at 87% with 90 respondents) cuts across almost all the options respondents considered as encouraging innovation in mobile banking. Appropriate investments in new technologies, such as AI and Machine Learning incorporated into the channel, will be of greater importance. The banks' annual budgets must show good investments going into digital and technological innovations, with mobile leading the pack.

'Customer Feedback Integration' runs through selected options by respondents, with 76 respondents at 73%, which is also important to take note of. A deliberate customer feedback support strategy would mean that adequate investments are made in a customer relationship management system with a relevant ticketing structure that enhances the engagement process and deepens communication with customers. This would mean that before products and services are introduced on the mobile banking channel, the voice of the customer is obtained, testing and piloting will involve the users, and after the launch, relevant feedback is collected from the user experiences, and the cycle continues.

'Employee Training Programs' alone run through 65 respondents (63%), and it's worth noting. According to some of the conversations with the banks' executives and management personnel, appropriate capacity building and training for staff assigned to mobile banking delivery is critical to bringing the right impact and effective success. These training efforts must include the frontline personnel at the Tier bank branches, customer care personnel, direct sales personnel, technology/Infosecurity support personnel, developers, risk/fraud/control teams, and established agile team members. Capacity building for management and executive members will provide high-level alignment to improve support across the banks' support and business units.

‘Partnerships with FinTech Companies’ cut across alone with 59 respondents at 57%, which is also important to notice. Tier 1 banks will be in a good position to take seriously the partnership and collaboration with FinTechs, given how they can leverage their agility, scalability and technology to execute and acquire the best quality skills in the industry.

Interpretation of Results: How Mobile Banking Affects the Operational Efficiency of Tier 1 Banks

The RII model is used to rank the importance of the various aspects and factors which impact the operational efficiency of mobile banking in Tier banks:

‘Transaction processing’ was identified as the dominant and ranked topmost (at RII = 0.97115) in terms of how mobile banking facilitates banks’ operational efficiency strategy.

‘Service Delivery’ came 2nd ranked with RII=0.96538 as an operational efficiency tool of mobile banking.

A combination of ‘transaction processing’ and ‘service delivery’ would suggest the importance that bank customers attach to mobile banking as an outstanding tool to significantly improve their engagement and turnaround time with the banks. These interactions go a long way to afford customer loyalty and stickiness, reducing the rate of switching to competition.

Customers of Tier 1 banks and these banks’ leadership realise that mobile banking serves as a critical means in facilitating faster transaction processing and resource optimisation for the various services/products available to customers, and it also spearheads the service delivery anchor of the banks. With the mobile-first strategy of these banks, the impact on operational effectiveness, efficiency and error reduction shall remain the gains of Tier 1 banks in Ghana. This means that banks’ products and services delivery is better provided on the mobile banking digital channel than any other.

Mobile banking as a ‘cost reduction’ and cost efficiency/optimisation resource is ranked in 3rd position with an RII of 0.93654. Investment in technology during the initial stages of mobile banking delivery can be high, although in the medium to long term, the cost will become significantly less, and the cost-saving on optimised resources (both human and technology), increases in fee income due to transaction fees applicable.

Instructively, other avenues of cost reduction will include these:

- Infrastructure savings
- Enhanced customer self-services: Accenture (2023) found that automation in banking can reduce operational costs by 25-30%. The World Bank (2020) in its ‘Global Financial Inclusion and Digital Payments’ report asserts that digital financial services (mainly mobile-led) lower transaction processing costs by 80-90% compared to traditional banking.
- Increased Return on Investment (ROI): According to Accenture (2017), banks offering mobile services can achieve ROIs as high as 300%, attributed to increased

customer engagement and the ability to cross-sell services effectively through digital channels.

- **Data-driven decision-making:** Mobile banking collects valuable customer data and insights, enabling banks to analyze behaviour, preferences, and needs. This information further enhances cost efficiency by supporting targeted marketing, personalized services, and informed strategic decisions.

According to a study by Boston Consulting Group (2023), AI-driven analytics in mobile banking can reduce fraud-related losses by 20-25%.

Deloitte reported in 2016 and 2022 that the cost of mobile transactions in future may become 50 times lower than branch transactions and likely 10 times lower than transactions via ATM terminals.

A report by Deloitte states that “digital customer acquisition costs are 30-50% lower than traditional methods” (Deloitte, 2022)

Mobile banking further enhances ‘employee productivity’, which expands into increased service delivery, customer experiences, and cost savings.

Interpretation of Results: Strategies to Improve Mobile Banking Effectiveness in Tier 1 Banks

From Table 4.2a of the previous chapter, ‘enhancing cybersecurity measures’, which had the majority of the respondents at 93% (97 respondents), is an important strategy that must be adopted to improve mobile banking efficiency in Tier 1 banks in Ghana. This emphasises the critical need for safeguarding the bank and its assets while securing the experiences (plus reducing scams, fraud, and social engineering situations) of the mobile banking customers.

Banks and other institutions have placed strategic focus on implementing enhanced cybersecurity measures to protect users from data breaches, fraud, and cyber threats.

Relevant strategic initiatives tackling mobile banking security risks for banks include these: Increased adoption of multi-factor authentication (MFA); Implementation of advanced encryption technologies; AI and machine learning for fraud detection; Biometric authentication (fingerprint, facial recognition, etc); Regular security updates and patch management; Customer awareness and cybersecurity training; Regulatory compliance (cyber guidelines, etc).

References include: A 2023 report by the Federal Reserve found that banks using MFA saw a 40% drop in account takeover fraud (Federal Reserve, 2023); Juniper Research estimates that AI will save banks USD 10 billion annually by 2027 by preventing fraud (Juniper Research, 2023); A 2024 study by Gartner found that biometric authentication reduces fraud by 80% in mobile banking; IBM’s 2023 Cost of a Data Breach Report found that encryption reduces breach costs by USD 360,000 per incident.

‘Improving user experience’ (UX) (91%) and ‘enhancing mobile banking features’ (89%) ranked second and third places respectively, indicating the fact that deliberate bank strategies with a focus on improved user experiences and differentiating features/services of the mobile banking channel are effective and impactful on performance.

Increasingly, customers are living their entire lifestyle on mobile and digital platforms, and they require that almost all the things they enjoy doing are supported by their mobile banking channels. Improved user journeys with zero glitches and flows that are fluid to serve the experiential needs and use cases of customers.

According to McKinsey (2022), Deloitte (2023), D.J. Power (2023), Gartner (2022), Accenture (2023) and Forrester (2023), improving the user experience (UX) and enhancing the features and services of mobile banking remain a crucial strategy for commercial banks globally. Thus, Tier 1 banks will need to deepen and prioritise the execution of these for their mobile banking channels to deliver quality value for customers and the bank:

- Simplify onboarding and secure authentication by ensuring frictionless sign-up processes, user electronic Know Your Customer (eKYC), biometric authentication, and other digital identity verification.
- Intuitive user interface and user experience (UI/UX) design with personalised insights for account transactions, spend trends, and notifications.

There will also be a need to integrate AI-enabled chatbots and voice-activated banking for hands-free transactions.

One of the industry respondents submitted that: “Targeted Features Services (TFS) - Features that are relevant to specific market segments are directed at them. This reduces the impression of being overwhelmed with services they do not need, user-focused and improved experience duration.”

- Implementation of real-time fraud alerts to detect out-of-the-ordinary transactions and behavioural biometrics for enhanced security
- AI & Predictive Banking with smart budgeting tools and proactive alerts to interact with customers seamlessly and on the go
- Seamless omnichannel experience, e.g. allow users to start transactions on mobile and complete them in-branch (PwC, 2023); AR/VR Support, e.g. virtual assistants guiding users to navigate banking features (Capgemini, 2023).
- Integration of open banking technologies, sandboxes and third-party APIs, which would connect FinTech apps and services for convenient and frictionless payments (Open Banking Report, 2023).

The current survey also identified other strategies that are critical success factor for mobile banking for Tier 1 banks namely, ‘Increasing customer education and awareness’ (which ranked in 84% of respondents) and ‘partnering with FinTech companies’ (81% of respondents) have the highest ‘Least Effective’ ratings (17 and 20 out of 104 respondents, respectively).

Many studies have reiterated reasons why banks need to increase customer education and awareness of their mobile banking services (Agyemang & Agyare, 2024; Addy, 2015; Gambo, 2020; McKinsey, 2023; PWC, 2023). Customer education and awareness for mobile banking is a critical strategy for improving Tier 1 banks' performance due to the fact that it drives adoption, encourages user confidence, enhances customer satisfaction and loyalty, boosts operational efficiency, and positively impacts revenues or performance (through the increase in transaction volumes, reduced cost-to-serve). Nubank, a Brazilian FinTech and neobank, attributes its growth to a customer-centric approach, including self-service education via its app, achieving Net Promoter Scores (NPS) above 85 despite scaling to over 10 million users (Zendesk, in its 'Five banking customer experience trends to consider for 2025'). According to Zendesk, awareness campaigns that emphasize convenience and security enhance the customer experience, reducing churn. The banking trends report notes that 77% of business leaders see deeper personalization (enabled by education) as key to customer retention/loyalty, a benefit augmented by mobile banking adoption.

Kumar & Ravindran (2022) and Saeed & Donkoh (2024) found that many customers, especially in emerging markets, hesitate to use mobile banking due to a lack of understanding or fear of fraud. Educating them on security features and benefits can drive higher usage.

Another key mobile banking strategy Tier 1 banks will need to stay competitive and relevant is 'partnering with FinTech companies'. This current study identified that strategic collaboration between traditional banks and FinTech companies remains critically important for improving mobile banking performance. Even FinTech may be seen as competitors and companies seeking to take away banks' market share, the reality on the ground is that without deliberate partnership between the two, banks are likely to lag in innovation, new/advanced technologies, agility, enhanced digital offerings, functional security, and competitive customer engagements. Banks mainly provide FinTechs with regulatory expertise, customer trust, the financial infrastructure and in some instances the financial muscle. This collaboration can lead to improved digital banking experiences, increased customer satisfaction, and competitive advantages. FinTechs in emerging markets significantly contribute to banks' financial inclusion drive with advanced technologies, expertise, agility and innovative execution.

Interpretation of Results: Challenges Banks Face Leveraging Mobile Banking Channels for Efficiency

The topmost-ranked challenge impacting the delivery of mobile banking by Tier 1 banks for their efficiency is 'High Cost', which relates to the cost associated with the technology and services supporting the channel's implementation and sustainability for continuity. These costs would mostly surface within the short-term on deployment of the technology, and then the costs would start coming down at a reducing rate between the medium-term

to long-term. The need to inject a variety of investments over the years will support better efficiency and improved profits (PWC, 2023).

‘Competition from FinTechs’ scored the 2nd highest ranked as one of the challenges facing mobile banking. This directly implies the level of competition the FinTechs, including the telcos and mobile money operators, pose to the performance of Tier 1 banks.

Another key mobile banking challenge Tier 1 banks face is staying competitive and relevant while growing FinTech and innovations. These FinTechs can provide better agility and technological innovation with their mobile app solutions, and that creates stiff competition for banks. This current study identified that strategic collaboration between traditional banks and FinTech companies remains critically important for improving mobile banking performance. Even FinTech may be seen as competitors and companies seeking to take away banks' market share, the reality on the ground is that without deliberate partnership between the two, banks are likely to lag in innovation, new/advanced technologies, agility, enhanced digital offerings, functional security, and competitive customer engagements (PWC, 2023). Banks mainly provide FinTechs with regulatory expertise, customer trust, the financial infrastructure and in some instances the financial muscle. This collaboration can lead to improved digital banking experiences, increased customer satisfaction, and competitive advantages. FinTechs in emerging markets significantly contribute to banks' financial inclusion drive with advanced technologies, expertise, agility and innovative execution.

‘Lack of Skilled Personnel’ and ‘Resistance to Change’ came 3rd and 4th, respectively. Thus, both internal and external lack of adequate skills/knowledge and typical resistance to the technology change remain a direct threat to mobile and digital innovation growth and scale. Relevant staff education and capacity building that will bring employees up to speed with the mobile technology. Employee resistance to change can equally be dealt with by leveraging quality capacity building and deepening hands-on training (Oheneba-Acquah & Dey, 2018; PWC, 2023).

SUMMARY OF DISCUSSION

Mobile banking is a critical contributor to the performance of Tier 1 banks and banking performance in Ghana. Thus, banks' executives and management will need to give the channel a closer focus, improving their investments in the channel, leveraging it for their customer acquisition and retention, and revenue growth strategies. FinTech competition is here to stay, and strategic partnerships by banks will enable significant scale and enhanced impact for banks. Deliberately engaging customers, improving their understanding of the channel, deepening education, and enabling more value-added features and services of mobile banking are important strategic milestones that banks must focus on. Mobile banking channel is of critical relevance in driving further research covering digital innovation, digital economy, payments, banks' performance and profitability and financial inclusion.

CONCLUSION

This conclusion summarizes the key findings, implications, and contributions of this research.

This study's results show that:

- a. From the analysis with the statistical regression tool, both the independent variables, namely Volume (at 0.89) and Value (at 0.84), are not statistically significant predictors of the dependent variable, ROA (with the p-value, $p > 0.05$). The Volume and Value do not significantly predict ROA for Tier 1 banks' performance.
Thus, only 11.2% of ROA variation is explained by Volume and Value. The remaining 88.8% is attributed to other factors not included or explored in this study.
- b. From the survey, mobile banking impacted banks' performance significantly in the areas of customer satisfaction, operational efficiency, revenue growth, profitability, market share and returns for shareholders accordingly.
- c. User interface and experience, and features/services of mobile banking, are the most influential factors of mobile banking performance from the perspective of customers.
- d. Mobile banking significantly improved the financial inclusion agenda of Tier 1 banks in Ghana
- e. Transaction processing and service delivery are critical influential factors of mobile banking, and users digitally engage with the banks because of those
- f. The topmost strategies to improve the performance of mobile banking were enhancing cybersecurity measures and improving user experiences
- g. Revenue generation and customer retention stood out as the significant contribution of mobile money to mobile banking performance in Tier 1 banks
- h. The efficiency challenges banks face with mobile banking related to the high cost of the channel and stiff competition from FinTech companies in Ghana
- i. Opportunities afforded by mobile banking included customer acquisition and retention, and revenue growth for Tier 1 banks.

Implications and Contributions

The current study's findings have several implications for bank leaders, the banking sector, investors, policy makers and regulators, and researchers or academia:

- a. Mobile banking is a critical contributor to the performance of Tier 1 banks and banking performance in Ghana. Thus, banks' executives and management will need to give the channel a closer focus, improving their investments in the channel, leveraging it for their customer acquisition and retention, and revenue growth strategies. It's the best digital and innovative channel that can best drive financial inclusion and expand the banking corridors for the many in Ghana. FinTech competition is here to stay, and strategic partnerships by banks will enable

significant scale and enhanced impact for banks. Deliberately engaging customers, improving their understanding of the channel, deepening education, and enabling more value-added features and services of mobile banking are important strategic milestones banks must focus on.

- b. Policy makers and regulators must understand that mobile banking directly drives financial inclusion and that policies to deepen this reality will expand the digital economy and improve the lives of the masses in Ghana. They should be aware of avoiding the introduction of policies which will leave the channel unattractive, such as direct user taxes, among others. Incentives must be pointed at banks and FinTechs in the space to encourage them to put in relevant investments and other resources in the mobile banking channel and its new technologies.
- c. Researchers and academia will recognise the mobile banking channel as being of critical relevance in driving further research covering digital innovation, digital economy, payments, banks' performance and profitability and financial inclusion.

This research contributes to the existing literature by providing insights into the relationship between mobile banking and banks' performance in the banking and financial industry.

CONCLUSION AND FINAL THOUGHTS

In conclusion, this study provides valuable insights into the impact of mobile banking on the performance of Tier 1 banks and deepens the required understanding into the various influencing factors and strategies for enhancing the performance of the channel for the banking industry. The findings highlight the importance of the mobile banking channel for strategic banking leadership and promoting business innovation and critical success. This research contributes to the existing literature and provides implications for bank leaders, the banking sector, investors, policy makers and regulators, and researchers or academia.

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