Digitalization and its impact on commercial banks' profitability in Vietnam

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ARTICLE INFO	ABSTRACT				
DOI: 10.46223/HCMCOUJS. econ.en.15.1.3281.2025	Amid the rapid development of the digital economy in Vietnam, traditional industries, including commercial banking, must				
	recognize digitalization as both a prevailing trend and an essential				

nd an essential requirement for sustainable development. This study utilizes the Feasible Generalized Least Squares (FGLS) regression method to Received: March 04th, 2024 examine the impact of digitalization on the profitability of Revised: May 23rd, 2024 Vietnamese commercial banks from 2013 to 2022. Profitability is Accepted: May 26th, 2024 measured by Return on Assets (ROA), while the digitalization level is represented by the ICT Index (Information and Communication Technology Development and Application Readiness Index). The model also incorporates two control variables: Credit Risk and JEL classification code: Solvency. The findings demonstrate that digitalization has improved G21; O33; G14 profitability in commercial banks. Additionally, credit risk is found to have a negative impact on the profitability (ROA) of commercial Keywords: banks, while the solvency ratio shows the opposite. Based on these results, the authors propose recommendations to enhance the commercial banks; digitization process and consequently elevate operational efficiency digitalization; ICT index; profitability; Vietnam and profitability in Vietnamese commercial banks.

1. Introduction

Digitalization in the banking industry of Vietnam has been progressing robustly in recent years. According to G. Nguyen (2023), only in the fourth quarter of 2022, over 1.5 billion transactions were conducted using Internet Banking and Mobile Banking. Given the increasing demand for digital services, most commercial banks set their mission to satisfy their customers' needs and, therefore, continuously introduce new IT-based products, bringing users new experiences, such as IoT applications that many businesses choose to deploy and adapt to the initial steps of digitalization.

The impact of digitalization on the business performance of banks around the world has been widely recognized by various researchers, who aim to provide significant policy implications to further promote these inevitable trends. The research by Moffat (2017) conducted in Kenya shows a positive relationship between business efficiency and investment in mobile banking, Internet banking, and ATMs, measured by the operating cost-to-income ratio. In the US, another study demonstrates a positive correlation between technical developments in the banking system and banks' performance, especially in reducing costs and increasing revenues by applying technological advancement (Berger, 2003). Following the world's digitalization trends, Vietnam is also witnessing a gradual transformation demonstrated by impressive figures, which show the stronger competitiveness of financial institutions as well as the rapid adaptation of individual and institutional customers. In particular, most financial institutions in Vietnam 100% digitized their fundamental banking operations, in addition to the fact that 90% of transactions are conducted by digital channels instead of brick-and-mortar offices. This transformation has helped businesses optimize their Cost-to-Income Ratio (CIR), which is reduced to 30 - 40% (Hoang, 2023). In general, studies found prevailing evidence to confirm the strong linkage between digitalization and viability and growth in the banking sector.

However, in some countries, digitalization in commercial banks, especially small banking businesses, has been facing considerable headwinds on the way to reap the fruits of innovations. This is explained by the fact that digitalization requires significant investment in evolving technologies as well as optimizing and innovating business processes to sell products and services online. Besides the advantages, the digitalization process in the banking sector also faces multiple difficulties in real life. In spite of the radical changes triggered by the Industrial Revolution 4.0 in the outside world, some mechanisms and policies in banks, such as infrastructure investment, operational management, security, safety, confidentiality, etc., are still lagging behind the rapid advancements in technology. This reality can limit the impacts of digitalization on profitability enhancement.

Even though there are a variety of studies by foreign scholars on this topic conducted in different contexts, scopes, and fields, only a few cover the impact of digitalization in Vietnamese banks on profitability in the period from 2013 to 2022. The authors chose the 2013 timeline because starting from 2013, a number of important legal documents related to digitalization in the banking industry were also issued. Not only that, 2013 also witnessed the appearance of mobile transaction channels from large commercial banks such as Vietcombank and Vietinbank. This opens opportunities for the authors to deepen the understanding of digitalization in commercial banks in Vietnam.

Therefore, this research is conducted to answer the following research questions: How does digitalization affect bank performance from 2013 to 2022? Besides, do other determinants (Credit Risk and Solvency) impact Vietnam commercial banks? What implications should be raised to promote the profitability driven by digitalization, thereby improving the profitability of Vietnam commercial banks?

The main purpose of this paper is to investigate the relationship between digitalization and bank profitability. Additionally, it also explores the influences of control variables like Credit Risk and Solvency on the bank's profitability. Based on the regression results, the authors suggest some implications to the government, State Bank of Vietnam (SBV), commercial banks, and other relevant stakeholders to enhance commercial banks' profitability.

In conclusion, the research with the title "Digitalization and its impact on commercial banks' profitability in Vietnam" aims to explore the relationship between digitalization and bank profitability to recommend new policies for boosting efficiency in the banking sector.

2. Theoretical basis

2.1. Theoretical framework

Resource-based theory suggests that businesses can create sustainable competitive advantages and achieve higher efficiency by utilizing and organizing resources in different ways. Barney (1991) assumes that resources are controlled and allocated internally within the enterprise, but each organization has different resource strategies due to uneven resource allocation between organizations.

In modern times, digitalization is also considered a resource revolutionizing business models, operating models, and organizational structures. According to resource-based theory, digitalization supports the financial sector by integrating digital technology (cloud computing, blockchain, AI, etc.) into operational processes to improve business models and operational efficiency of financial institutions. It can be said that the revolution in information technology has helped financial institutions, especially commercial banks, organize and allocate technology resources appropriately to promote sustainable competitive advantage, development, and innovation capacity.

The theory of innovation argues that any leader seeking profits for his or her business must innovate Schumpeter (1934). To gain a competitive advantage, businesses will continually find ways to create new products, new services, and new production processes that leave their competitors behind. Advances in science, technology, and innovation will create competitive advantages for businesses as they reduce asset losses through minimizing operating costs as well as achieving maximum utilization. company resources in the most effective way, etc.

Yao and Song (2021) commented that innovation can not only bring more innovative products and services to customers but also bring more new ways for commercial banks to mobilize capital. Commercial banks can use technologies such as blockchain and distributed accounting to process transaction data of individuals and small and medium-sized enterprises. In addition, other technologies in the financial technology (Fintech) industry can solve the problem of high costs when collecting information from customers as well as processing long and cumbersome transaction chains. Fintech improves the lending efficiency of commercial banks and increases bank revenue (Gu & Zhang, 2018). Thus, it can be said that technological innovation partly significantly reduces costs, improves profits, increases efficiency in information collection, decision support, and operational management, and increases productivity, ability to mobilize capital, and other aspects.

Therefore, based on this theoretical framework, we studied the relationship between digitalization and bank profitability.

2.2. Literature review

2.2.1. Digitalization

Digitalization refers to the integration of digital technologies and infrastructures across diverse dimensions of businesses, the economy, and society. In the banking sector, digitalization enables innovation in business models to enhance value creation (Kane et al., 2015). It also aids companies in building short-term and long-term strategies to sustain the firm for future economic uncertainty. Additionally, with technologies like artificial intelligence, blockchain, and big data, banks can develop new products and digital services, thereby boosting revenue and reducing costs to enhance profitability.

However, digitalization can be measured through various approaches. Azmi et al. (2020) sent questionnaires to businesses to identify the level of technological innovation, such as ebanking or the internal application used. Xiang and Jiang (2023) adopted the "Bank Digital Transformation Index" developed by the Digital Finance Research Center of Peking University. In addition, another method to gauge digitalization is text analysis which is based on the frequency of keywords related to digitalization in the annual report (Kriebel & Debener, 2019; L. T. H. Nguyen et al., 2023). In Vietnam, most of the studies use the ICT Index of the Ministry of Information and Communication (Le & Pham, 2022; Q. T. T. Nguyen et al., 2023). Hence, this research will measure digitalization through the Vietnam Information Communication Technology (ICT) index.

2.2.2. Bank profitability

Profitability in commercial banks is determined by the ability to maintain capital, absorb loan losses, sustain the growth of assets, and yield returns to investors. Financial ratios are widely recognized to be the most generally used methods for assessing a bank's financial situation (Mamatzakis & Remoundos, 2003), as they aid in bank performance evaluation and facilitating comparisons across banks of different sizes (Guru et al., 2002; Vasiliou & Frangouli, 2000). Many financial ratios can be used to assess bank profitability performance, such as Returns on Assets (ROA), Returns on Equity (ROE), and Net Interest Margins (NIM).

In this study, profitability performance was measured by the Return on assets ratio. It is calculated as net income divided by total assets. This ratio indicates the bank's efficiency in producing revenue from assets. Higher ROA signifies efficient asset utilization for profit generation and strong performance. This indicator is considered the best and most important measure of bank profitability (Golin, 2001; Rivard & Thomas, 1997).

2.2.3. Digitalization and bank profitability

With limitless potential and enormous benefits, digitalization and the relationship between digitalization and organizational performance have become a topic of research interest for many domestic and foreign scientists. In particular, research projects around the world have been carried out in different contexts, scopes, and fields including banking, making important theoretical and practical contributions, and are valuable sources of data for government, policymakers, and managers to refer to Zuo et al. (2021) evaluated the impact of technology investment of 50 commercial banks in China from 2011 - 2019, showing that banking technology investment plays an important role in the development of banking technology, and financial technology (Fintech). Fintech promotes production efficiency, transaction efficiency, and management efficiency, improving the bank's production efficiency. Banna and Alam (2021) show that the full adoption of Digital Financial Inclusion (DFI) will lead to the stable development of ASEAN banks, which will not only reduce the banks' default risk but also improve financial mobility in the region.

However, a few existing studies also show mixed effects between digitalization and bank performance. Malhotra and Singh (2009) hold an opinion that digitalization does not enhance profits in Indian banks, while other researchers show that digital transformation has a detrimental influence on a bank's performance (through the return on assets and return on equity (L. T. H. Nguyen et al., 2023). This can be explained by the non-linear relationship between two variables, meaning that it requires a few years for digital technology to be effective (Kriebel & Debener, 2019; Xiang & Jiang, 2023).

The importance of digitalization in the banking sector is indisputable. It enables banks to transition from traditional to modern business models, assists banks to larger customer bases simultaneously, and provides online customer services for easier access, thereby attracting more customers and generating increased revenue. Additionally, digitizing employee workflows conserves human resources, enhances operational efficiency, accelerates transaction processing times, and ultimately reduces operating expenses (Zhai et al., 2022). Thus, digitalization can boost the bank's profitability not only by increasing revenue through innovative products and services but also by increasing work efficiency and improving operating costs. This significantly

positive relationship has been confirmed by Do et al. (2022); Chhaidar et al. (2022). Therefore, we propose the research hypothesis as follows.

Hypothesis: Digitalization has a positive impact on Bank Profitability

2.3. Research gap

While digitalization offers immense opportunities for enhanced efficiency and innovation, many organizations, including banks, face challenges in implementing it effectively and sustainably. These challenges stem from both external and internal factors. External factors include market volatility, evolving customer behavior, technology investment risks, and internal factors such as resource constraints, human capital limitations, infrastructure deficiencies, and the lack of a well-defined digitalization strategy.

Theoretically, research on the impact of digitalization on the performance of commercial banks remains inconclusive due to variations in research context, scale, and time frame. Some studies have identified positive effects of digitalization, while others have observed negative impacts on performance due to initial investment costs or short-term disruptions.

Considering both practical and theoretical perspectives, further research is needed to evaluate the impact of digitalization on the performance of commercial banks in Vietnam.

3. Methodology

3.1. Research model

In addition to the main independent variable of digitalization, the authors also identify the impacts of other factors, such as credit risk and solvency, on bank profitability.

3.1.1. Credit risk and bank profitability

Credit is a crucial activity that generates the primary income for banks. However, this exposes banks to credit risk, which is defined as the potential loss of a portion or all of the outstanding loans due to credit events (default risk). Based on this definition, credit risk is typically measured by the ratio of non-performing loans to total outstanding loans. Credit risk is an inherent factor that determines a bank's operational efficiency. The higher the level of credit risk a bank faces, the greater the likelihood of a financial crisis, and vice versa. Recognizing the critical role of credit risk management in bank performance, the authors suggest that the adoption of new technologies and online banking practices can enhance credit risk management, thereby improving banks' profitability.

3.1.2. Solvency and bank profitability

The solvency ratio, measured as the proportion of a bank's equity capital to its total assets, gauges the institution's risk exposure. This ratio reflects the extent to which a bank relies on its funds rather than debt to finance its operations. Consequently, it also indicates a bank's ability to meet all short-term and long-term liabilities. A higher ratio signifies a more solvent bank, while a low ratio suggests potential difficulty repaying debts. The study of Athanasoglou et al. (2006) finds a positive significant relationship between the solvency ratio and profitability.

Based on previous research models, the research authors used multiple regression analysis methods for panel data. Therefore, we proposed a research model as follows:

$$ROA_{i,t} = \alpha_0 + \alpha_1 \ ICT_{i,t} + \alpha_2 \ CREDIT \ RISK_{i,t} + \alpha_3 \ SOLVENCY_{i,t} + \varepsilon_{i,t}$$
(1)

Table 1

Variables Description

Symbol Variable measurement		Sources	References	
Dependent variable		·	<u>.</u>	
Return-on-Asset (ROA)	Ration between net income and Total assets	Annual reports and audited financial statements	Rivard and Thomas (1997); Golin (2001)	
Independent variable	<u> </u>			
Information, Communication, and Technology Index (ICT)	Survey of Vietnam ICT Index annually	Report of Vietnam ICT Index Annually	Le and Pham (2022); L. T. H. Nguyen et al. (2023); Nguyen et al. (2021)	
Control variables				
Credit risk	The ratio of Bad Debt to Total Outstanding Debt	Annual reports and audited financial statements	Poudel (2012); Gizaw et al. (2015); Chhaidar et al. (2022)	
Solvency	The ratio between equity and total assets	Annual reports and audited financial statements	Athanasoglou et al. (2006); Petria et al. (2015)	

Note. Compiled by the authors team

3.2. Research method

Initially, descriptive statistics are conducted to gain a broad understanding of the dataset's characteristics. Following this, both the correlation matrix and VIF test are employed to gauge the strength and direction of relationships between variables. Subsequently, various tests, including the F-test, Breusch and Pagan Lagrangian multiplier test, and Hausman test, are carried out to determine the most suitable model. Many researchers used regression techniques such as pooled regression model (POOL), Fixed Effects Model (FEM), and Random Effects Model (REM). These techniques are frequently used and are suitable when the regression assumptions are not violated. However, these estimation techniques are not optimal due to errors in heteroskedasticity and serial autocorrelation in this research model. Therefore, to correct the model defects, the Feasible Generalized Least Squares model (FGLS) is chosen to ensure accurate and objective estimation results.

3.3. Research sample data

The research used secondary data collected from various sources. After the process of screening and eliminating observations that lack information or have outliers that affect the reliability of estimation, the research authors synthesized the data. Interpolation is used to fill in missing values (Guo, 2023; Park et al., 2021).

Therefore, the research data is panel data of 17 Joint Stock Commercial Banks over 10 years in the period from 2013 to 2022, which is equivalent to 170 observations. The below table provides the list of observed Joint Stock Commercial Banks.

Table 2

No	Name	Abbr.
1	Asia Commercial Joint Stock Bank	ACB
2	BAC A Commercial Joint Stock Bank - Bac A Bank	BAB
3	Joint Stock Commercial Bank for Investment and Development of Vietnam	BID
4	Vietnam Joint Stock Commercial Bank of Industry and Trade	CTG
5	Vietnam Export Import Commercial Joint Stock - Eximbank	EIB
6	Military Commercial Joint Stock Bank - MB	MB
7	The Maritime Commercial Joint Stock Bank - MSB	MSB
8	National Citizen Bank - NCB	NCB
9	Orient Commercial Joint Stock Bank	OCB
10	Saigon-Hanoi Commercial Joint Stock Bank	SHB
11	Southeast Asia Commercial Joint Stock Bank - SeABank	SSB
12	Saigon Thuong Tin Commercial Joint Stock Bank - Sacombank	STB
13	Vietnam Technological and Commercial Joint Stock Bank - Techcombank	TCB
14	Tien Phong Commercial Joint Stock Bank	TPB
15	Joint Stock Commercial Bank for Foreign Trade of Vietnam	VCB
16	Vietnam International Commercial Joint Stock Bank	VIB
17	Vietnam Commercial Joint Stock Bank for Private Enterprise - VPBank	VPB

List of Joint Stock Commercial Banks in Vietnam

Note. Compiled by the authors team

The total assets of these 17 joint stock commercial banks were approximately 11,100,000 billion VND in the year 2022, accounting for 87.4% of the total assets of the entire banking sector. This illustrates that the research sample qualifies the generalization and representation of the whole banking industry in Vietnam.

4. Result and Discussion

4.1. Result

4.1.1. Descriptive statistics

Table 3

Variable	Obs	Mean	Std. dev.	Min	Max
ROA	170	0.0104319	0.0076838	0	0.0361
ICT	170	0.5272724	0.1414651	0.0787	0.8114
CreditRisk	170	0.018435	0.0156214	0.0035	0.179
Solvency	170	0.0819998	0.0271113	0.04	0.1697

Descriptive Statistics of Research Variables

Note. Results of data processing using Stata 17 by the research team

Table 4

Variable	VIF	1/VIF
ICT	1.02	0.984166
CreditRisk	1.01	0.988052
Solvency	1.00	0.995755
Mean VIF	1.01	

Multicollinearity (VIF) of Research Variables

Note. Results of data processing using Stata 17 by the research team

Table 3 illustrates the descriptive statistics for four variables: Digitalization (ICT), Return on Asset (ROA), Credit Risk, and Solvency of 17 commercial banks in Vietnam from 2013 - 2022. The Return on Assets of banks is 1.04319% on average with a high of 3.61% and a low of 0%. The digitalization among commercial banks in Vietnam is 52.72724%, the lowest value is 7.87% and the highest is 81.14% followed by a standard deviation of 14.14651%. This indicates the notable difference in the level of digitalization between commercial banks and the data for digitalization is quite scattered. The Credit risk of banks ranges from 0.35% to 17.9% with a mean of 1.8435% while the Solvency ratios vary from 4% to 16.97% with an average of 8.19998%.

Furthermore, in Table 4, the VIF outcomes of all variables are significantly small (VIF < 2) and this suggests there is no multicollinearity in the study (Hair et al., 2017).

Table 5

Correlation Matrix

	ROA	ICT	Credit Risk	Solvency
ROA	1.0000			
ICT	0.1854	1.0000		
	0.0155			
Credit Risk	-0.2165	-0.0633	1.0000	
	0.0046	0.4123		
Solvency	0.6138	-0.1082	-0.0085	1.0000
	0.0000	0.1601	0.9121	

Note. Results of data processing using Stata 17 by the research team

The correlation matrix (Table 5) summarizes the strength and direction of linear relationships related to digitalization and bank profitability. The correlation between ROA and Digitalization (ICT) is 0.1854 with a sig of 0.0155. This suggests a positive relationship as ICT increases, the ROA slightly increases as well. Furthermore, the two control variables CreditRisk and Solvency have correlated coefficients of -0.2165 and 0.6138, respectively. This indicates that bank profitability has a negative relationship with Credit Risk and a strong positive relationship with Solvency.

4.1.2. Regression results

The data was analyzed using the STATA 17 with OLS regression, Fixed-effects model, Random-effects model, and Feasible Generalized Least Square regression.

The Wooldridge test for serial correlation and the Breusch - Pagan test for heteroskedasticity was conducted and FGLS regression was used to fix these errors.

Table 6

ROA	Coefficient	Std.err.	Z	P > z	[95% conf. interval]	
ICT	.0058393	.0016596	3.52	0.000	.0025867	.009092
CreditRisk	0587875	.0169956	-3.46	0.001	0920983	0254767
Solvency	.1473717	.0137134	10.75	0.000	.1204938	.1742495
_cons	0044642	.0015002	-2.98	0.003	0074044	0015239

Feasible Generalized Least Square Regression Result

Note. Results of data processing using Stata 17 by the research team

Table 6 demonstrates the FGLS regression of the effects of Digitalization (ICT) on the profitability of commercial banks in Vietnam.

The variable Digitalization (ICT) has a positive impact on the dependent variable ROA at the 1% significance level. The coefficient shows that when other factors remain unchanged, an increase or decrease in Digitalization of 1 unit will lead to banks' profitability (ROA) increase or decrease by 0.0058393 units. The more banks promote Digitalisation, the more their operating profitability (ROA) increases, so the hypothesis: Digitalization has a positive impact on the Return on Assets (ROA) ratio of commercial banks is accepted.

The coefficient of the control variable Credit Risk is -0.0587875 with $\alpha < 0.01$ indicating that credit risk has a negative impact on the ROA index. The estimated coefficient shows that an increase in the credit risk of 1 unit will reduce the dependent variable ROA by 0.0587875 units. Furthermore, the control variable Solvency has a positive impact on the dependent variable ROA at the 1% significance level with the regression coefficient is 0.1473717, showing that an increase of 1 unit of Solvency will increase 0.1473717 unit of ROA.

4.2. Discussion

The regression result confirms a positive and statistically significant relationship between Information and Communication Technology (ICT) investment, used as a proxy for digitalization, and commercial bank profitability in Vietnam. This finding aligns with recent studies by Zhai et al. (2022), Do et al. (2022), Chhaidar et al. (2022). The positive relationship can be explained by some reasons, including cost reduction, revenue expansion, and thus, higher profitability. Firstly, ICT investments in automation, data management systems, and online platforms can streamline back-office operations, automate tasks, and improve process efficiency. This results in lower operational costs, allowing banks to retain more profits. Secondly, digital platforms built on ICT infrastructure enable banks to reach new customer segments, particularly those located in remote areas or those who prefer online banking experiences. Additionally, digital tools facilitated by ICT can enable faster loan processing and create more innovative financial products, leading to increased revenue streams. The Vietnamese banking sector, with its high mobile phone penetration rate and a growing tech-savvy population, presents a strong foundation for reaping the benefits of ICT-driven digitalization.

The negative relationship between credit risk and ROA aligns with expectations and is well-supported by prior research (Chhaidar et al., 2022; Gizaw et al., 2015; Poudel, 2012). Loan defaults lead to direct financial losses, reducing a bank's income stream from interest payments.

Furthermore, defaulted loans can force banks to write down the value of those assets, decreasing their overall capital base. This decline in capital can then negatively impact a bank's market value and its ability to attract new investors. In severe cases, high credit risk can lead to bank insolvency and even bankruptcy. Reducing credit risk also means improving loan quality, reducing bad debt, and positively affecting the main source of revenue for banks. Moreover, commercial banks in Vietnam have unique opportunities to leverage digitalization to mitigate credit risk. In fact, digital tools like credit scoring algorithms and big data analytics can enhance loan screening processes and allow for more real-time monitoring of borrower performance. Thus, the encouragement to adopt such technologies could be a potential policy intervention to strengthen the Vietnamese banking system and promote sustainable profitability.

The significant positive effect of Solvency on banks' profitability is appropriate. This result is consistent with the studies of Athanasoglou et al. (2006), Petria et al. (2015), which suggest that higher solvency has a positive impact on operating profitability because it reduces the risk faced by the bank. Furthermore, a well-capitalized bank (one with a strong solvency ratio) is more likely to secure favorable lending terms, which can translate into lower borrowing costs. This, in turn, allows the bank to allocate more resources toward core operational activities, potentially leading to improved efficiency and profitability. Furthermore, a strong solvency ratio can positively influence external risk perception. As investors might perceive well-capitalized banks as less risky, this leads to a lower cost of capital. Similarly, depositors might feel more secure placing their money with solvent banks. This can further improve a bank's financial health and profitability.

5. Conclusions and recommendations

This study examines the impact of digitalization on the profitability of commercial banks in Vietnam from 2013 to 2022. The regression results obtained from the FGLS method show that digitalization has a positive impact on the ROA of commercial banks in Vietnam. Secondly, the research team found that the credit risk index (CreditRisk) has a negative impact on the profitability (ROA) of commercial banks. Thirdly, the authors also found that the solvency ratio (Solvency) has a positive impact on ROA, meaning that when solvency increases, the ROA of commercial banks also increases.

Based on the above results, the authors propose the following recommendations to improve the operational efficiency of commercial banks in Vietnam through digitalization:

For state authorities, *firstly*, it is necessary to improve regulations and provide an enabling environment for banks' digital efforts. *Secondly*, regular monitoring and assessment of digitalization projects by the State Bank of Vietnam (SBV) can enhance their supervisory approach. *Additionally*, collaboration between the Ministry of Information and Communications, SBV, and other relevant bodies can promote communication and adoption of new technologies across the industry. *Finally*, SBV can introduce regulatory sandboxes and innovation hubs to encourage FinTech development.

For commercial banks, the recommendations focus on internal changes. *Firstly*, fostering awareness and employee participation in digitalization is crucial. *Secondly*, identifying and addressing skill gaps through employee surveys and talent management strategies is vital. Collaborating with IT companies for project execution and with government agencies for strategic planning is also advised. *Additionally*, banks should develop communication plans to effectively launch digital services to the public, and finally, establish strong data security and privacy policies to protect customers' information and comply with regulations.

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