

*Digital Transformation in the Banking Sector:
Efficiency on Economic Development in Vietnam*

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Abstract

In the development of technologies, digital transformation is one of the essential factors of the fourth industrial revolution, leading to digitizing all aspects of society. While many developed countries have made significant progress in digitalization, Vietnam is still in the early stages of its digital transformation journey. The study focuses on the advantages of digitalization in the banking sector and its broader implications for economic growth in Vietnam. By analyzing secondary data from various sources through R, including the Ministry of Information and Communications of Vietnam and commercial banks' annual reports, the paper investigates the positive relationship between the digital transformation indicator, the ICT (Information and Communication Technology) index, and Vietnamese commercial banks' net interest margin (NIM). This research demonstrates digitalization's benefits in preventing NIM equal to 0 ($p < 0.05$). The findings of this study can inform the State Bank of Vietnam's policymakers and banking institutions about the role of digital transformation in shaping the future of the Vietnamese economy.

Keywords: Vietnamese Banking Sector, ICT Index, Digital Transformation, Economic Growth

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1. Introduction

The Fourth Industrial Revolution, characterized by integrating digital technologies into various sectors, presents a pivotal opportunity for sustainable development and economic transformation. As noted by Pollitzer (2018), this revolution is a dominant force shaping the future of societies, economies, and the environment. Digital transformation has significantly altered financial services within the banking sector by adopting technologies such as artificial intelligence and the Internet of Things, fundamentally reshaping interactions and operations (Lugovsky, 2021). Additionally, this transformation is crucial in advancing the United Nations' Sustainable Development Goals, addressing global challenges across social, economic, and environmental dimensions (Galdino et al., 2023). The COVID-19 pandemic has further accelerated the necessity for digital transformation, as lockdowns and social distancing measures have shifted a vast array of commercial and social activities online, leading to an unprecedented increase in data consumption and reliance on digital infrastructure (Brannen et al., 2020). This digital shift is not uniform globally; while developed countries like Japan, China, and the United States have made substantial progress, developing nations, exemplified by Vietnam, are in the nascent stages of their digital transformation journeys, striving to integrate information technology into their economic frameworks.

Deputy Prime Minister Ha emphasizes that economic activities in Vietnam are rapidly shifting towards a green, knowledge-based, and low-carbon circular economy, with the digital economy at its core (Khoi, 2023). Because the banking sector is a modern service sector and the lifeblood of the entire economy, its activities span all socio-economic functions, closely intertwined with the overall economic dynamics. Therefore, leading the way in digital transformation, the banking sector has propelled other economic sectors to undergo digital transformation as well, collectively realizing the goals of the National Strategy for Socio-Economic Digital Development (SBV, 2023).

Moreover, under the management of The State Bank of Vietnam, the digital transformation strategy of the banking sector for the period of 2021-2030 has become an extremely crucial strategy, orienting the future development of the banking industry (SBV, 2023). This strategy aligns the banking sector's growth with the advancement of science and technology. It also creates the urgency to improve the legal framework and policies to create favorable conditions for developing digital payment and digital banking. Besides, it will ensure information security and safety in banking activities. Commercial banks need to promote the integration of linking goods, services, and platforms with other economic sectors and fields to create a digital ecosystem and provide clients with a smooth experience across all of the products and services they use.

According to the Department of Informatization, Ministry of Information and Communications of Vietnam (2023), digital transformation transfers all activities from traditional environments to digital environments, from actual society to cyberspace. This definition has become more and more popular while technology is developed; we can connect all over the world with technology devices such as mobile and laptops. With all the reasons above, this study thus investigates the necessity and efficiency of banking's digital transformation to Vietnamese economic growth. To demonstrate this point, this paper uses the panel data of twenty-six commercial banks and time series data of digital payment transaction values to emphasize the advantages of digitalization and its influences on the Vietnamese banking sector and general economic growth.

2. Literature Review

Digital transformation represents a research area that garners substantial interest among scholars and is a critical determinant of economic expansion. Digital transformation shifts customer expectations and creates new opportunities for business growth and innovation. Extensive literature exists on the role of digital transformation in facilitating economic growth (Pollitzer, 2018; Ndemo, 2021). Moreover, in an increasingly interconnected world, digital technologies are pivotal in reshaping economies, societies, and governance structures, offering innovative solutions to complex issues, and fostering inclusive growth.

Some studies assert that the banking industry, one of the forerunners in integrating technology into daily operations, has benefited from the digital revolution by having access to various options to connect and service many consumers, supporting all-encompassing financial development (Lugovsky, 2021; Wewege and Thomsett, 2020; Khams, 2022).

In summary, the various arguments presented underscore the increasing importance of digital transformation as a strategic approach to foster economic growth within the context of the Fourth Industrial Revolution. Furthermore, transitioning from traditional banking to digital banking will likely offer significant opportunities for cost reduction, enhancement of human resource quality in banks, and increased profitability through easier customer access to electronic platforms. However, there remains a notable need for quantitative analyses measuring the practical impact of digital transformation on economic development within the banking sector. Additionally, prior research in Vietnam has yet to explore the correlation between the Information and Communication Technology (ICT) index and the net interest margin (NIM).

3. Data and Methodology

The ICT index is the primary independent variable used to measure the digital transformation in the Vietnamese banking sector, and it was collected by the Ministry of Information and Communications of the Socialist Republic of Vietnam. With the first hypothesis, net interest margin (NIM) is the dependent variable that represents the assessment of the financial health of banks within the business domain. A high net interest margin (NIM) indicates that a bank is profitable. Other variables are calculated by the author according to the annual reports of twenty-six Vietnamese commercial banks from 2005 to 2022. Especially, to assess the efficiency of digital transformation on Vietnamese economic growth, this paper use digital payment transaction value from 2017 to 2022 through Statista and some economic indicators data from World Banks.

Table 1. Summarize data of analyzing the correlation between ICT index and Net interest margin (NIM) from 2005 to 2022

Variable	N	Mean	Standard Deviation	Minimum	Maximum
NIM	468	0.0298	0.0129	-0.0078	0.0908
ICT	468	0.3692	0.2832	0	1.0000
SIZE	468	31.2518	5.1181	0	35.2905
Non-performing loan (NPL)	468	0.0154	0.0161	0	0.1793
Liquidity risk (LIQ)	468	0.5184	0.1657	0	0.9245
Bank risk (RISK)	468	0.0120	0.0065	0	0.0378
Operational efficiency (OPC)	468	0.0157	0.0063	0	0.0470
Capital adequacy (CAR)	468	0.1026	0.0712	0	0.7121

Source: Author's construction¹

This study employs flexible quantitative models to measure the effectiveness of digital transformation on the banking sector and the Vietnamese economy. To examine digital transformation's impact on bank performance through net interest margin indicator, one-way and two-way Pooled OLS, fixed effect model and random effect model are used with a multiple linear regression model as below:

$$NIM_{it} = \beta_0 + \beta_1 ICT_{it} + \beta_2 SIZE_{it} + \beta_3 FI_{it} + u_{it} \quad (1)$$

Where

NIM_{it} is the net interest margin (NIM) of commercial bank i in year t ;

α_0 is constant term;

ICT_{it} is ICT index of commercial bank;

$SIZE_{it}$ is natural logarithm of total asset.

FI_{it} is a vector of some financial ratio of Vietnam commercial bank – non-performing loan (NPL) is defined as the ratio of overdue debt to total outstanding debt; liquidity risk (LIQ) is measured as customer loans divided short-term financing; bank risk (RISK) is the ratio of credit risk provisions to total loans; operational efficiency (OPC) is measured as operating costs and total assets; and capital adequacy (CAR) is defined as equity capital divided by total assets with risk-weighted.

4. Results

This paper aims to demonstrate the effectiveness of digital transformation in the growth of the Vietnamese banking sector by analyzing the correlation between economic factors and independent variables using a quantitative approach and R (Posit) software.

First, using panel data from Vietnamese commercial banks and econometric models such as Pooled OLS, fixed effect model, and random effect model, the first hypothesis highlights how

¹ Data source: Ministry of Information and Communications of the Socialist Republic of Vietnam and Vietnamese commercial banks' annual report

ICT has a beneficial impact on NIM. It is said that the banking industry is benefiting from the efficiency of digital transformation. The Hausman test validates the applicability of the random effects model in this analytical setting, emphasizing how well it captures the dynamics of time effects in the dataset.

Table 2. *Regression results of panel data*

	Dependent variable					
	Net interest margin (NIM)					
	One-way model			Two-way model		
	Pooled OLS	FE	RE	Pooled OLS	FE	RE
Digital transformation (ICT)	0.006*** (0.002)	0.007*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.008*** (0.002)	0.007*** (0.002)
Size of bank (SIZE)	0.00003 (0.0001)	-0.00003 (0.0001)	-0.00002 (0.0001)	0.00003 (0.0001)	-0.00001 (0.0001)	-0.00001 (0.0001)
Non-performing loan (NPL)	-0.008 (0.030)	0.023 (0.028)	0.018 (0.027)	-0.008 (0.030)	0.025 (0.030)	0.020 (0.028)
Liquidity risk (LIQ)	0.010*** (0.003)	0.016*** (0.003)	0.015*** (0.003)	0.010*** (0.003)	0.017*** (0.004)	0.016*** (0.003)
Bank risk (RISK)	0.116 (0.081)	0.145* (0.085)	0.159* (0.082)	0.116 (0.081)	0.188** (0.087)	0.162** (0.082)
Operational efficiency (OPC)	1.019*** (0.081)	0.776*** (0.084)	0.814*** (0.083)	1.019*** (0.081)	0.765*** (0.090)	0.806*** (0.083)
Capital adequacy (CAR)	0.049*** (0.007)	0.060*** (0.006)	0.058*** (0.006)	0.049*** (0.007)	0.059*** (0.007)	0.058*** (0.006)
Observations	468	468	468	468	468	468
Adjust R-squared	0.507	0.472	0.502	0.507	0.457	0.503
F-Statistic	69.737*** (df = 7; 460)	64.139*** (df = 7; 435)	478.293* **	69.737** *	64.139** *	478.293* **

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Source: Analyzing by author by using RStudio

The regression analysis presented in Table 3 investigates the influence of various predictors on the dependent variable, NIM, across both one-way and two-way models. The results indicate that the ICT index consistently exerts a significant positive impact on NIM, as evidenced by coefficients ranging from 0.006 to 0.008, significant at the 1% level. Similarly, liquidity (LIQ), risk (RISK), operational capability (OPC), and capital adequacy ratio (CAR) also show positive and statistically significant relationships with NIM across all models, suggesting that increases in these variables are associated with enhancements in NIM. Conversely, the size of the entity (SIZE) and non-performing loans (NPL) exhibit negligible and non-significant effects, indicating a minimal influence on the dependent variable. The

robustness of the models is confirmed by high adjust R-squared values of approximately 0.457 to 0.507 and significant F-statistics, demonstrating that the models possess strong explanatory power and adequately capture the variability in NIM. These consistent findings across the two models affirm the reliability of the models and the stability of the variable effects on NIM, enhancing the robustness of the analytical approach employed.

5. Discussion

This study's results indicate that the value of digital transformation positively impacts effective capital utilization and enhanced profitability within the bank, notably, and the Vietnamese economy's growth in general. Furthermore, digitalization can help reduce expenditure in Vietnamese commercial banks in the long term. This study produced results that corroborate the findings of a great deal of the previous work in this field. These results agree with the findings of other studies, in which the digital transformation in the banking sector promotes Vietnam's economic development.

NIM, also known as Net Interest Margin, plays a pivotal role in assessing the financial health of banks within the business domain. A high NIM signifies a bank's adeptness at generating profits. However, there has been a recent contraction in banks' NIMs. This trend can be attributed to Vietnamese commercial banks' proactive measures in lowering loan interest rates to provide vital support to individuals and businesses grappling with economic challenges. This strategic move aims to stimulate borrowing and economic activity. Despite these efforts, banks need more support in significantly reducing input savings interest rates, which impacts their overall NIM. This scenario underscores the delicate balance banks must strike between supporting borrowers and managing their profitability. As economic conditions evolve, banks will continue navigating these complexities to maintain a healthy NIM and ensure sustainable financial performance. Vietnamese commercial banks striving to maintain the upward trajectory of NIM recovery must persist in enhancing their financial competencies and managerial strategies, with an emphasis on adhering to global benchmarks like Basel II and Basel III (Trang, 2024). Efficient management practices play a crucial role in diminishing operational expenditures and augmenting NIM. Concurrently, the reorganization of offerings and services is imperative for augmenting revenue streams within this domain. Presently, numerous banks are fervently advancing innovative services and embracing digitalization to amplify non-interest revenue and bolster the institution's NIM. The active shift towards digital platforms also serves to optimize operational outlays, constituting a favorable factor in NIM recuperation efforts. With statistically significant results, this study found that digitalization helps increase the net interest margin of Vietnamese commercial banks. This finding confirms that digitalization is associated with the profitability of Vietnam's banking sector, which is one of Vietnam's crucial goals. At the same time, all commercial banks are trying to prevent the NIM from being zero during this economic depression after the effect of the COVID-19 pandemic. This finding has important implications for promoting digital transformation. Besides, this finding further supports the idea that digital transformation impacts Vietnamese banks' performance by analyzing the association between the ICT index and the ROA index or assessing the efficiency of digitalization through qualitative methods. These results match those observed in earlier studies.

Although Vietnam's digital transition offers hope, several obstacles must be overcome to realize its full potential. Still in its infancy, the legal structure regulating digital transactions and services must change quickly to keep up with the rapid advancement of technology,

which will need clarification for both customers and businesses. Furthermore, a significant obstacle to the broad adoption of digital payment methods in Vietnam is the deeply established preference of a sizable percentage of the populace for cash-based transactions. The digital environment has many advantages but also increases the possibility of fraud. The global semiconductor shortage, which limits the accessibility and cost of necessary digital systems and devices, exacerbates this worry even more.

Moreover, Vietnam needs highly qualified information technology experts to lead and maintain digital innovation. The glaring disparity in digital access between urban and rural areas exacerbates these problems. A more cohesive and inclusive strategy for Vietnam's digital transformation is required because rural areas frequently need to catch up regarding access to and infrastructure for information technology. This creates a huge imbalance.

In summary, there are several possible explanations for these results. Amidst the prevailing surge in technological advancements, digital transformation has emerged as a pivotal and imperative objective, facilitating economic expansion across developed and developing nations. The ongoing integration process compels nations, exemplified by Vietnam, to pursue significant advancements in digital transformation. This endeavor is essential for aligning with the pace of global growth and fulfilling global sustainable development objectives. However, while Vietnam's digital transformation presents promising prospects, several challenges necessitate mitigation to unlock its full potential.

6. Conclusion

This study emphasizes the critical role of digital transformation in the banking sector as a catalyst for Vietnam's economic growth. This is the first time that net interest margin has been used to explore the advantages of digitalization in Vietnamese commercial banks. Digital integration within banks offers substantial benefits, including improved transaction efficiency and expanded market accessibility, which collectively drive economic expansion. However, this transformation has its challenges. Significant hurdles include the need for an evolving legal framework, alignment with shifting consumer preferences, managing fraud risks, addressing technological shortages, and mitigating disparities in IT infrastructure and human resource. These elements necessitate a strategic and holistic approach to digital transformation in the banking industry. Adopting a balanced, well-informed, and flexible strategy that capitalizes on the benefits of digitalization and addresses its potential drawbacks is imperative. Such a strategic approach is crucial for fostering a resilient and inclusive digital financial ecosystem that supports sustained economic development in Vietnam. This comprehensive strategy requires continuous adaptation and integration of technological advancements, regulatory updates, and consumer-centric practices to navigate the complexities of digital transformation effectively. The pace of digital transformation in the banking and financial sectors is expected to accelerate, underscoring the importance of proactive and adaptive strategic planning.

In conclusion, the analysis underscores the necessity of formulating key policies to foster long-term digitalization within Vietnam's banking sector. A comprehensive strategy is essential to advance digital transformation effectively. The findings of this study have several important implications for future practice and make numerous recommendations for encouraging digital transformation in the banking sector in Vietnam. Because Vietnamese banking sector's digitalization has just started since 2017, it requires prolonged observation and further researches to assess both the positive and negative impacts of this process.

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