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Research Article

The Development of Internet Banking in Vietnam: Challenges, Solutions and Real Applications

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Abstract – *The advancement of digital technology and the process of digital transformation have significantly accelerated the adoption of Internet Banking in Vietnamese commercial banks. However, the lack of synchronized technological infrastructure, the reliability of international connectivity, and cybersecurity risks remain major challenges. This study aims to analyze the role of Internet Banking in enhancing banking performance, while clarifying existing limitations and proposing remedial solutions. The research methodology primarily relies on secondary data analysis from the State Bank, industry reports, and comparisons of Internet Banking implementation experiences in several countries in the region. The findings indicate that Internet Banking not only improves customer convenience, expands revenue sources, and reduces operating costs, but also fosters the comprehensive digitization of the banking system. Basically, the paper draws key lessons for the Internet Banking in Vietnam, including the importance of investing in digital infrastructure and backup connectivity, strengthening cybersecurity, and developing user-friendly, secure service models that meet international integration requirements. Moreover, we deeply analyze examples and statistic information to highlight the successes of Internet Banking in Vietnam.*

Keywords - *Digital Transformation, Internet Banking, and Technology Infrastructure.*

I. INTRODUCTION

In the context of Vietnam's strong digital transformation, the banking sector is facing significant changes in how financial services are provided and consumed. Internet Banking has emerged as a crucial transaction channel, accounting for over 95% of current electronic transactions [1]. It allows customers to perform payments, transfers, and account management online without dependence on traditional bank branches. Coupled with the widespread adoption of smartphones, extensive 4G/5G network coverage, and the Government's policy promoting non-cash payments, these conditions have created a favorable foundation for the strong development of Internet Banking in Vietnam.

Despite the rapid growth of Internet Banking in Vietnam, several challenges persist in expanding access. A prominent issue is the urban-rural digital divide. According to the State Bank of Vietnam, by the end of 2023, only 32.6% of communes/towns nationwide had a formal financial service provision point, whereas in urban areas, most residents already have access to electronic banking. In rural areas, although 89% of the population owns a mobile phone, only 68% possess a smartphone, which limits their ability to use online banking services [2]. The Mobile Money pilot program shows an effort to narrow this gap, with over 5.2 million accounts (accounting for 71% of the total surveyed) belonging to customers in rural, mountainous, and remote areas. However, overall Internet Banking penetration remains low compared to urban areas (Digital Transformation Report of the Banking Sector, 2023). Furthermore, cash-based habits, fear of risk, and the threat of high-tech crime further slow down the process of popularization. These challenges necessitate an urgent need to enhance

infrastructure coverage, improve digital skills for the public, and ensure information security during the development of Internet Banking.

Two significant gaps remain in the research on Internet Banking. First, there is a paucity of studies comparing international experience with the domestic Internet Banking adoption context to draw suitable lessons. Second, limitations concerning technology infrastructure, the reliability of online banking, and cybersecurity risks have not been adequately analyzed in relation to the operational efficiency of commercial banks.
Based on this reality, this paper focuses on analyzing the following aspects:

1. The role of Internet Banking in enhancing the operational efficiency of Vietnamese commercial banks.
2. The infrastructure and security constraints hindering the digital technology adoption process.
3. Analysis of international experiences to derive development lessons and propose sustainable solutions.

The study is conducted within the scope of Vietnamese commercial banks, based on secondary data from the State Bank of Vietnam, banking sector reports, and various international studies. The research contributes by providing practical evidence regarding the role and limitations of Internet Banking, while also learning from international experience to propose practical solutions for Vietnamese banks. Through this, the study is expected to make a practical contribution to the digital transformation process of the banking sector, moving towards sustainable and inclusive financial development in Vietnam's economic and financial sector.

II. THEORETICAL FRAMEWORK

A. Concept of Mobile Banking

Mobile Banking is a modern type of banking service that allows customers to use mobile phones or smart mobile devices to access, manage, and perform financial transactions with the bank without needing to visit a transaction counter directly. According to the Banking Journal (2021), Mobile Banking is understood as a form of providing banking services through a mobile platform, which helps customers perform most operations, such as checking balances, transferring money, paying bills, making deposits, or looking up financial information flexibly and conveniently.

Figure 1. Mobile Banking Offers a Range of Benefits for Vietnam Users

To use Mobile Banking services, customers need to register a bank account and a personal mobile phone number, and are then provided with an identifier (ID) and a PIN for the authentication and transaction security process. Transactions are performed entirely through an electronic environment, ensuring speed, accuracy, and safety. Fig.1 illustrates a mobile banking application in Vietnam.

Currently, Mobile Banking exists in three common forms:

1. SMS Banking: This was the initial form, allowing users to send and receive short messages to inquire about information or perform basic transactions.
2. Mobile Web (WAP Banking): This enables customers to access the bank's website via a mobile browser to conduct transactions.

3. Mobile Application (App Banking): This is the predominant trend today, where banks develop specialized applications on iOS and Android platforms. These apps provide a diverse range of financial and non-financial services and enhance security through encryption and multi-layer authentication.

Thus, Mobile Banking is not just a new transaction channel but also a crucial platform in the digital transformation process of the banking sector, aiming to provide customers with more comprehensive, convenient, and modern financial services (Banking Journal, 2021).

B. Development

The evolution of Mobile Banking is closely linked to advancements in mobile technology, wireless Internet, and the trend of digital consumerism. The development process of Mobile Banking in Vietnam can be divided into three main phases:

1. Initial Phase: In the early stage, Mobile Banking was primarily implemented as SMS Banking, offering basic services such as balance inquiries, internal transfers, or balance change notifications. While the technology was limited, the service scope was narrow, and security was not highly advanced, this marked the first step in familiarizing customers with the convenience of electronic banking.
2. Explosion Phase: From 2010 onwards, coinciding with the rise of smartphones and the expansion of 3G network infrastructure, Mobile Banking services experienced robust development. According to IDC data (2015), the number of global smartphones reached 1.43 billion units, representing a 10.1% increase from 2014. In Vietnam, approximately 40% of mobile subscribers were using smartphones, a figure forecasted to reach 70% by 2018. This provided a favorable environment for banks to expand their Mobile Banking services in both scope and functionality. Many banks began building their own application platforms, improving user interfaces, and adding online services such as payments, savings, investment, or insurance.
3. Integration and Modernization Phase: Since 2015, Mobile Banking has entered a phase of comprehensive development with the deep integration of digital banking services. Mobile applications are no longer limited to basic financial transactions but have expanded into areas such as stock investment, online shopping, ATM location services, customer support via chatbots, and linking with Fintech ecosystems. According to the Banking Journal of Vietnam in 2021, over 45 banks in Vietnam had implemented Mobile Banking, with 25 banks owning separate mobile applications. Fig.2 shows the development of mobile banking in Vietnam using 3G network.

Figure 2. Mobile Banking Development with the Expansion of 3G Network Infrastructure

Overall, Mobile Banking in Vietnam has undergone a clear transformation from the rudimentary phase using SMS messages to the smart application phase, moving towards multi-service integration and optimization of the user experience. This is an inevitable trend in the context of globalization and the digital transformation of the finance and banking sector.

C. Driving Technological Factors

The rapid development of Mobile Banking is inseparable from foundational technological factors, including:

1. The Popularity of Smartphones: The widespread adoption of smartphones as common devices has significantly broadened access to Mobile Banking. According to an IDC report in 2015 Vietnam was among the nations with the fastest smartphone growth rate in the ASEAN region. This widespread availability allows users to easily access digital banking services anytime, anywhere.
2. Strong Development of Wireless Networks and Mobile Internet Infrastructure: The introduction and prevalence of 3G, 4G, and more recently, 5G networks, enable banking transactions to be performed faster, more stably, and more securely. Continuous Internet connectivity also allows customers to access banking applications at any time [3].
3. Application of Advanced Security Technology: Banks have invested heavily in security technologies, including data encryption, OTP (One-Time Password) authentication, PIN codes, biometric recognition (fingerprint, facial recognition), and password matrices. These measures help enhance customer trust when performing electronic transactions [4].
4. Development of Mobile Application Platforms: Mobile banking applications significantly improve the user experience thanks to friendly interfaces, fast processing speeds, and the ability to integrate many financial and non-financial utilities such as information lookup, account management, online shopping, or ticket booking and bill payment. Fig. 3 illustrates the advantages of fintech.
5. Cooperation between Banks and Technology Enterprises: Many Vietnamese banks have actively collaborated with telecommunications companies and Fintech companies to leverage technical infrastructure, shorten deployment time, and reduce investment costs. This cooperation model also helps expand the service ecosystem, promoting financial inclusion and non-cash payments.

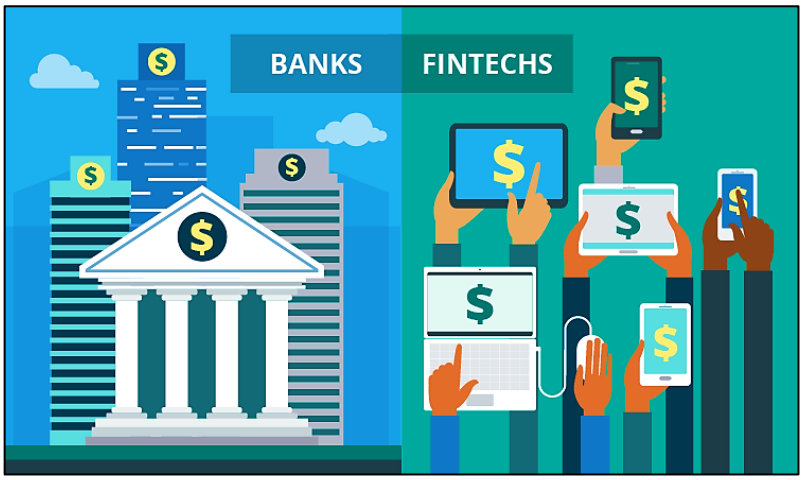

Figure 3. Fintech Bring Revolution in Banking Industry

In summary, the combined factors above show that technology plays a central role in the development process of Mobile Banking, not only supporting bank operations but also contributing to the shaping of modern digital banking trends in Vietnam. Fig.2 demonstrates benefits of fintech for Vietnam users.

III. RESEARCH METHODOLOGY

This study employs a mixed-methods approach, primarily utilizing qualitative and quantitative analysis based on secondary data collected from official domestic and international sources. This approach aims to analyze the role of Internet Banking in enhancing the operational efficiency of Vietnamese commercial banks, while simultaneously identifying limitations and drawing lessons from international experience. The research data was gathered from the State Bank of Vietnam (SBV), the Vietnam Banks Association, annual reports, and digital transformation reports of major commercial banks (such as Vietcombank, BIDV, VietinBank, Techcombank, and MB), along with specialized publications from the Banking Journal and the Journal of Economics and Development. Furthermore, the study references international reports from the World Bank, IMF, and ASEAN regional organizations for comparison and trend cross-reference.

The timeframe is limited to the period 2010–2024, reflecting the development and modernization process of Internet Banking services in Vietnam over the past decade. Regarding the research procedure, the paper is

implemented through three main steps. First, an overview of the theoretical framework and prior studies on Internet Banking and digital transformation in the banking sector is conducted. Second, secondary data is analyzed and compared, including descriptive statistics on usage rates, growth speed, and factors influencing service deployment. Third, lessons learned are synthesized and extracted, leading to the proposal of suitable development solutions for the Vietnamese context. The study simultaneously applies descriptive analysis to present the development trends of Internet Banking through quantitative indicators, and comparative analysis to contrast with the experiences of countries with advanced digital banking systems such as Singapore, South Korea, Malaysia, and Thailand.

IV. RESULTS AND DISCUSSION

A. Key Functions and Features of Internet Banking

Internet Banking is an online financial service system that allows customers to conduct banking transactions via an Internet connection without having to visit a transaction counter directly. Basic functions include account information inquiry, internal and interbank transfers, bill payments, phone top-ups, online savings deposits, and credit product registration. In addition, many Vietnamese banks have implemented advanced features such as QR code payments, personal expense management, online securities investment, online insurance, and e-wallet integration. These features not only offer convenience but also expand the interaction capabilities between the bank and the customer, forming a comprehensive digital financial service ecosystem. From a technical perspective, Internet Banking is currently operated based on a multi-layered security platform, including SSL/TLS encryption, multi-factor authentication (OTP, biometrics), and real-time transaction alert and authentication systems. Several banks, such as Vietcombank, Techcombank, and MB Bank, have applied Artificial Intelligence (AI) and Big Data analysis to automate processes, detect abnormal transactions, and personalize the user experience [5].

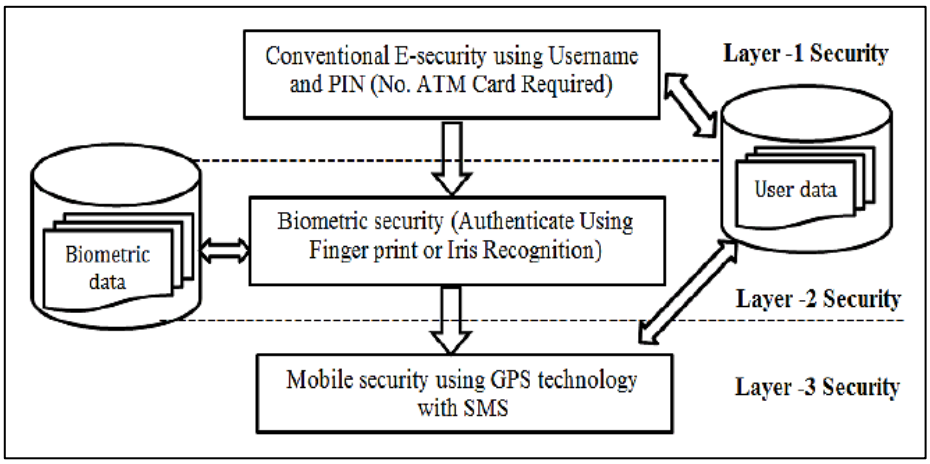

Figure 4. Example of a Multi-Layered Security Platform [8]

Thus, Internet Banking is not merely an electronic transaction channel but has become the core digital platform in banks' modernization strategies, meeting customers' increasing demands for speed, security, and convenience. Fig.4 shows layers of security for Internet Banking.

B. The Role of Internet Banking for Commercial Banks

Internet Banking holds a central position in the digital transformation process of commercial banks, evident in three main aspects:

Firstly, Internet Banking helps optimize operating costs. The shift from face-to-face to online transactions significantly reduces the bank's expenses on personnel, premises rental, and branch management. According to the State Bank Report in Vietnam in 2023, the average cost for an online transaction is only about 5–10% compared to a teller transaction [6].

Secondly, Internet Banking contributes to increasing non-credit service revenue. Services like bill payment, quick money transfer, online savings, and online investment generate stable revenue for the bank. VietinBank's Annual Report (2023) shows that revenue from electronic banking services increased by an average of 37% per year during the 2020–2023 period.

Thirdly, Internet Banking plays a vital role in enhancing service quality and customer management. The application of data analytics helps banks identify consumer behavior, forecast needs, and personalize products. Automated customer care systems, smart chatbots, and real-time transaction notifications significantly contribute to improving the user experience. In conclusion, Internet Banking not only helps banks increase business efficiency but also reinforces their competitive capacity and modern brand image, aligning with the global digital finance trend.

C. Internet Banking's Contribution to Finance and Society

Internet Banking makes significant contributions to the development of the financial system and the socio-economic landscape.

Firstly, Internet Banking promotes financial inclusion, helping expand access to banking services for people in rural, mountainous, and island areas. According to the State Bank of Vietnam (2023), the proportion of the adult population with a bank account increased from 63% in 2020 to nearly 80% in 2023, with over half using electronic banking services [7].

Secondly, Internet Banking contributes to promoting non-cash payments and the digital economy, aligning with Vietnam's National Strategy for Digital Economy Development until 2030. Online payment methods enable fast and transparent transactions for businesses and individuals, reducing cash-related costs and risks.

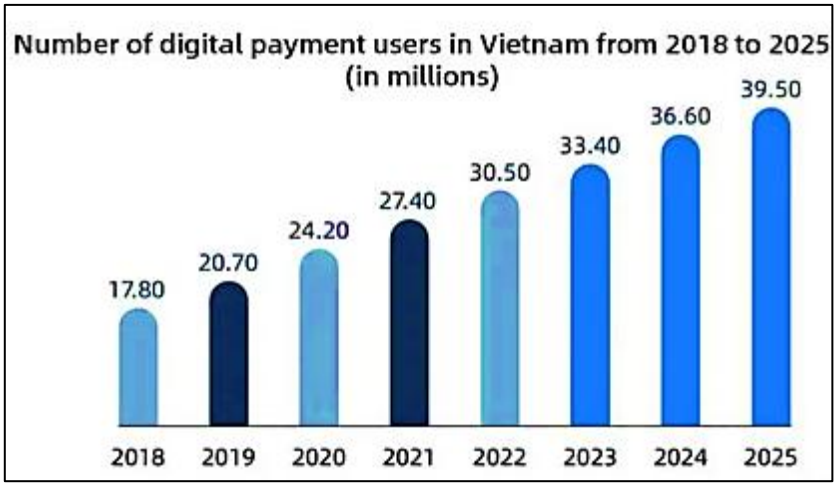

Figure 5. Number of Digital Payment Users in Vietnam from 2018 to 2025 (In Millions)

Thirdly, Internet Banking supports enhanced financial transparency and government management efficiency. Electronic transaction data helps control cash flow, prevent money laundering and financial fraud, and assists regulatory agencies in monetary policy planning [8]. Finally, Internet Banking brings practical social benefits, such as saving time and travel costs, reducing carbon emissions, and improving people's quality of life. Therefore, Internet Banking is considered one of the driving forces for the sustainable development of Vietnam's financial system in the era of digital transformation. Fig.5 shows the increasement of number of users in Vietnam that uses digital payment from 2018 to 2025.

D. Challenges and Development Solutions for Internet Banking in Vietnam

Although Internet Banking in Vietnam has achieved positive results, many challenges remain that must be overcome to ensure sustainable development.

Firstly, technology infrastructure limitations. The IT systems among banks are not uniform, particularly in smaller-scale banks. Data integration between different core banking platforms still faces many difficulties. The solution is for banks to invest in upgrading infrastructure, standardize technology architecture, apply cloud banking, and implement Open API standards to increase interoperability and data sharing.

Secondly, cybersecurity and safety risks. Forms of cyber attacks, transaction forging, and fraud are becoming increasingly sophisticated. The solution is to step up the application of advanced security technologies, including biometric authentication, AI in fraud detection, and real-time security monitoring systems; simultaneously, it is crucial to intensify communication and training on information safety skills for users.

Thirdly, the digital divide between regions. In rural and mountainous areas, the rate of Internet Banking usage remains low due to limitations in devices and digital skills. The solution is to develop financial education programs, implement the banking agent model, and Mobile Money to extend services to underserved areas.

Fourthly, limitations in the legal corridor. Regulations on electronic transactions, personal data protection, and legal liability in case of risk still lack consistency. The solution is for the State to finalize the legal framework for digital banking, clearly define the rights and obligations of related parties, and issue common technical standards for data security and information safety. In summary, the sustainable development of Internet Banking in Vietnam requires synchronized coordination among regulatory bodies, commercial banks, technology companies, and users, moving towards a safe, inclusive, and effective digital financial ecosystem.

V. CONCLUSION

The research findings show that Internet Banking plays a central role in the digital transformation process of Vietnam's banking sector. This service not only contributes to modernizing banking operations, optimizing operating costs, and expanding non-credit revenue sources, but also brings clear social benefits through promoting financial inclusion, reducing cash usage, and enhancing the efficiency of national financial management. The development of Internet Banking in Vietnam reflects an inevitable trend in the context of international economic integration and technological innovation. However, the implementation process still faces several challenges such as non-uniform technology infrastructure, cybersecurity risks, the digital divide between regions, and an incomplete legal framework. Identifying and addressing these issues is critical to the sustainability of the digital banking system. The research results affirm that Internet Banking is not just a service tool but a strategic development driver for Vietnamese commercial banks in the digital era, contributing to shaping a modern, transparent, and user-friendly financial model.

Conflicts of Interest

The authors declare that there is no conflict of interest concerning the publishing of this paper.

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