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## Digital technology of the banking sector in Vietnam

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### Abstract

In recent years, the world has witnessed a strong explosion and profound influence of science and technology on the development of the global economy. The banking industry is undergoing many changes under the impact of digital technology. Applying digital technology in banking activities in Vietnam has had a positive impact on the operating model, internal business system and providing advanced products and services to customers. The article uses analytical methods to evaluate the current situation of digital technology application in banking operation in Vietnam. From there, the author proposes a number of solutions to promote the application of digital technology in the digital transformation process of the banking industry in the coming time.

**Keywords:** Digital technology, digital transformation, digital banking

### 1. Introduction

Digital transformation can be simply understood as the process of using digital technology to change business processes, culture and existing customer experiences. According to Pham Xuan Hoe (2021) <sup>[18]</sup>, digital transformation goes through 3 main stages. The first is the conversion of the unit's traditional, manual processes to digital, online processes (considered the digitalization stage). Next is the digital transformation phase, digital technology is promoted in application during this phase. The final stage is the digital regeneration phase, through the connection between technology and digital platforms that have never existed before to improve the efficiency of banking operations with innovative new products and services.

Thus, digital technology is considered advanced technology used in the next stages of digital transformation after going through the digitalization stage. Once the system has digitized data, technologies such as AI, Big Data, Cloud Computing... will be used to analyze data, transform and create new value. At this level of digital technology, the application will open up forms of innovation and creativity in an entire industry or field instead of just upgrading or converting traditional processes and procedures.

Applying digital technology is an inevitable trend that every organization takes advantage of to improve operational efficiency and competitiveness. In the banking sector, digital technology application brings important benefits such as: Creating new products and services, eliminating physical boundaries in business activities, eliminating intermediate steps, saving operating costs and bringing convenience to customers. Besides, thanks to abundant management information and a smooth reporting system, management becomes effective, from which managers can make quick and accurate decisions.

In the world, there have been many studies related to digital technology and banking operations such as Barroso & Laborda, 2022; Arjun, *et al.*, 2021; Alkhowaiter, 2020 <sup>[3, 2, 1]</sup>. Alkhowaiter (2020) <sup>[1]</sup> analyzed studies related to the acceptance of various electronic payment tools through banks such as: payment by phone, payment via e-wallet, mobile banking, electronic banking, online banking, electronic money, electronic payment. Research by Barroso & Laborda (2022) <sup>[3]</sup> synthesizes research on digital transformation in the field of financial technology and banking in 3 contents: regulations, cooperation and challenges. Developing banking data information is also mentioned in the study of Arjun and colleagues (2021) <sup>[2]</sup> when using research that addresses technological interaction in banking such as automatic interaction, mobile device application, virtual consultations.

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Research on digital technology in the banking sector has also received a lot of attention from Vietnamese researchers such as research by Xuan, Nga, Hanh (2021) <sup>[18]</sup> on factors affecting the intention to change technology in banking operation in the 4<sup>th</sup> industrial revolution in Vietnam, with proposed factors: usefulness, ease of use, trust, social factors, innovation factors, efficiency factor. Phuong & Giang (2021) <sup>[7]</sup> explore the impact of technological innovation on the efficiency of Vietnamese commercial banks. Research shows that the technological innovation index has a positive impact on the cost efficiency of Vietnamese commercial banks...

However, digital technology changes intermittently and there are limits to researchers' understanding of technological developments. Therefore, research on digital technology in the field of finance and banking always has limitations. In addition, Vietnamese banks are in the digital transformation phase, so digital transformation studies in the banking industry is few and fragmented. Therefore, analyzing the current situation of digital technology application in the banking sector in Vietnam to propose solutions is very necessary.

## 2. Evolution & digital technology of the banking sector

Inheriting the technological development of the 4.0 industrial revolution and the development of banking technology after the 2008 global financial crisis, Vietnam has prepared the foundation for the application of digital technology in economic activities through the promulgation of the High Technology Law and the development of the National High Technology Development Program to 2020. In 2014, the Politburo issued Resolution No. 36-NQ/TW <sup>[8]</sup> on "Promoting Strengthen the application and development of information technology to meet the requirements of sustainable development and international integration". By 2019, the Politburo issued Resolution No. 52-NQ/TW <sup>[9]</sup> on "Some guidelines and policies to proactively participate in the fourth industrial revolution". In addition, the State Bank has also gradually issued regulations on technology application in the period 2016-2020. In 2019, the State Bank issued Decision 2655/QD-NHNN <sup>[10]</sup> on "Approving the Information Technology Development Strategy for Vietnam's banking industry to 2025, with a vision to 2030" and Decision 2738/QD- NHNN on <sup>[11]</sup> "The State Bank's information technology application plan in 2020". Accordingly, the State Bank issued regulations aimed at reviewing the legal basis for the operations of State Bank and commercial banks under the impact of the 4.0 industrial revolution as well as upgrading technical infrastructure and information security for the banking industry.

The regulations and policies of the Government in general and the State Bank in particular show the determination of management agencies to proactively participate in the 4<sup>th</sup> industrial revolution to apply modernity technologies to improving the operational efficiency of fields and industries as well as promoting the process of integration into the global economy.

## 3. Scope of digital technology

In the digital transformation strategy, commercial banks have proactively transformed both customer communication channels and internal operations. Many banks have tested

and applied new technical solutions and technologies such as: Artificial intelligence (AI), machine learning (ML), internet of things (IoT), Big Data, Cloud Computing, Distributed Ledger Technology (DLT), Blockchain, Robotic Process Automation (RPA), Biometrics... in operations and products and services to improve operational efficiency and increase customer experience. In particular, Big Data and AI technologies are most applied by banks to analyze customer behavior and needs to optimize and personalize the provision of products and services. Some advanced technologies are applied to banking activities such as:

### 3.1 Big Data

Big Data allows people to collect and store huge amounts of data. If previous technology needed a very long time to process data, but today's digital technology allows processing and analysis in a very short time to find information and make appropriate decisions. (Truong Dinh Dung, 2022) <sup>[4]</sup>.

### 3.2 AI/ML

AI/ML will help automate operations that previously required human intelligence, mainly based on huge data sources analyzed with higher security capabilities. ML makes machines capable of self-learning like humans. Because data is getting bigger and computing power is getting faster, ML has breakthroughs in deep learning techniques such as: visual perception, voice recognition, decision making... For the banking sector, AI has been widely applied and will continue to develop with Chatbot/Chatbox applications, data collection and analysis, risk management, anti-money laundering... (Truc Linh, 2021; Nguyen Thanh Thu, 2021) <sup>[6, 13]</sup>

### 3.3 IoT

IoT is a combination of the Internet, microelectronics technology and wireless technology. The Internet helps connect supporting devices such as smartphones and computers to exchange and share data in real time. IoT describes everyday physical objects that are connected to the Internet and can identify themselves to other devices thanks to increasingly small, low-cost and low-energy sensing devices. IoT plays an important role in connecting the real environment and the digital environment (Nguyen Thanh Thu; 2021) <sup>[13]</sup>.

### 3.4 Cloud Computing

Cloud Computing allows users to use information storage services thanks to providers such as Google, Microsoft, Amazon. All data is stored, organized and sorted on the service providers' systems. Banks can implement marketing automation strategies based on this technology platform to save costs, minimize security risks and optimize bank resources. Cloud Computing allows banks to provide services to customers continuously every day through any device with an Internet connection (Manh Vy, 2010) <sup>[16]</sup>.

## 4. The current situation of digital technology application in banking operations in Vietnam

### 4.1 Results

Through awareness of the importance of digital technology in banking activities, commercial banks have applied new

technical and technological solutions to their professional activities and supply of products and services to improve operational efficiency and increase customer experience. Banks have invested in technological innovation and developed sales channels through digital technology such as: Internet Banking, Mobile Banking... Many banks have upgraded their core banking system to meet development requirements such as: Joint Stock Commercial Bank for Investment and Development of Vietnam (BIDV), Vietnam Joint Stock Commercial Bank for Industry and Trade (VietinBank), Joint Stock Commercial Bank for Foreign Trade of Vietnam (Vietcombank), Vietnam Bank for Agriculture and Rural Development (Agribank)... To meet customer expectations, traditional banks have integrated digital technology into their operations, while taking advantage of innovative business models. Some results recorded from applying digital technology to banking activities include:

Application of AI, ML, Big Data technology: Some AI technology applications have appeared in internal operations such as: Management system, credit activities, Chatbot, Marketing... Some banks have applied combining AI, ML and Big Data technology to evaluate, classify customers and

decide on disbursement... which helps simplify processes and shorten transaction time with customers. Vietcombank Digibank and BIDV SmartBanking are new generation digital banks of Vietcombank and BIDV based on the integration of Internet banking and Mobile banking, applying AI to launch the digital transaction space and putting robots into use. In addition, TPBank (Tien Phong Commercial Joint Stock Bank) and VIB (Vietnam International Commercial Joint Stock Bank) integrate AI technology in Chatbot/Chatbox applications to support chat and interact with multi-channel customers: Facebook, Instagram, Website, Zalo... Customers can easily interact and manage across channels on a single screen. In particular, VIB combines AI technology with Big Data processing technology into the credit scoring and credit card limit approval process.

Regarding biometric technology, TPBank is the first bank to successfully apply biometric character recognition technology for facial recognition with Automatic Banking (LiveBank 24/7). After that, many banks used eKYC (Electronic Know Your Customer) identification as a method of minimizing personnel costs, attracting customers, and optimizing data management systems.

**Table 1:** Some digital technology applications of commercial banks in Vietnam in 2023

Digital technology applications	BIDV	VietinBank	Vietcombank	Agribank	VIB	TPBank
AI/ML applications	BIDV SmartBanking	VietinBank iPay	Vietcombank Digibank	Agribank E-mobile Banking	MyVIB	T'Aio
Big Data on IoT platform	x	x	x	x	x	x
Cloud Computing	x	x	x	x	x	x
Biometrics	x	x	x	x	x	x
eKYC	x	x	x	x	x	x

**Source:** Author's compilation

A number of other technologies are also researched and tested by commercial banks and put into operation such as Cloud Computing technology, Vietnam Prosperity Joint Stock Commercial Bank (VPBank) applies cloud platform (Amazon Web service Cloud) for launched a digital bank called Cake. In addition, Vietinbank, LienViet Post Joint Stock Commercial Bank (LPBank), Asia Commercial Joint Stock Bank (ACB)... have used ledger technology to record detailed transactions (accounts, customers, products...) to serve the purpose of multi-dimensional analysis of income, costs, profits... according to management and operating requirements. In addition, Blockchain technology is also being tested and gradually applied, such as HSBC with letter of credit (L/C) transactions; Ho Chi Minh City Development Joint Stock Commercial Bank (HDBank) applies Blockchain technology to connect and process trade finance transactions.

In addition, commercial banks also strengthen cooperation with Fintech to provide digital products and services based on multi-channel platforms to ensure a rich experience for customers such as the combination of VietinBank and Opportunity Network (ON) in providing digital platforms for businesses, the cooperation of Vietcombank and M-Service in money transfer payments; VIB and Weezi Digital provide MyVIB Social Keyboard application to help customers ability to transfer money via social networks... Thanks to the support of Fintech, many digital models and products have appeared such as: Mobile Wallet, Peer-To-

Peer Transfer, Peer-To-Peer Lending, Mobile Payment, Mobile Banking. Companies which involved in the payment business provide customers and retailers with online payment services or digital payment solutions.

In general, the majority of commercial banks in Vietnam have applied digital technology to their internal and professional operations. Channels for interacting and reaching customers are based on digital technology. Thanks to that, the number of customers participating in payment transactions via mobile phones and the Internet grew strongly compared to the same period last year, especially during the time of Covid-19. State Bank statistics show that in the first 9 months of 2023 <sup>[12]</sup>, payment transactions via Internet channels grew by 45,34% in quantity and 10,7% in value; via mobile phone channels increased by 56,37% and 12,54% respectively over the same period in 2022. To date, the entire market has about 120 million e-wallets and more than 3,300 billion VND maintained in an electronic wallet to perform payment transactions (HyperLead, 2023). At the same time, about 18.8 million accounts and cards were opened using eKYC along with more than 13.2 million bank cards that were activated electronically according to regulations in Circular No. 17/2021/TT-NHNN (2021) of the Governor of the State Bank (Pham Anh Tuan, 2023) <sup>[14]</sup>. However, due to limitations in the level of technology investment and digital transformation strategy, the digital technology development of Vietnamese banks still has a large gap compared to banks in the world.

## 4.2 Challenges in implementation

Practice shows that a series of digital products and services offered by commercial banks have made a huge difference in the entire industry and created a competitive advantage in the market. To provide banking services based on modern technology, safety and security must be a top priority given the increasing trend of cybercrime with complex tactics. The integration process between technology and banking operations must be carried out carefully and with large investments.

In Vietnam, the application of digital technology still has many challenges, requiring continued research to perfect the legal framework, especially electronic transactions, electronic signatures, electronic contracts, electronic identity and authentication, management and supervision mechanisms for Fintechs... The application of digital technology in banking activities is not only due to Fintechs, but many commercial banks are gradually converting and operating on modern technology platforms such as: BIDV, VietinBank, TPBank,... However, compared to some countries in the region, the number of Fintechs in Vietnam is still quite small. By the end of 2022, the number of Fintech companies operating in Singapore is 1580 companies, Malaysia has 612 companies, Thailand has 293 companies while Vietnam has only 176 companies (HyperLead, 2023). Fintech applications operate based on customer databases, so the possibility of customers' personal information and data being stolen or disclosed is possible. Therefore, there needs to be a complete legal corridor to create a favorable environment for Fintechs to invest in the banking sector, avoiding the situation that the legal corridor cannot keep up with real life requirements.

Threats, security issues in the online environment and user awareness are things that need attention. Cyber security is not only limited to data theft and financial fraud, but is also a matter of national security. Although there are many legal documents issued in the country such as: Law on Information Technology, Law on Cyber Information Security, Law on Cyber Security... however, there is still a lack of regulations on personal data protection, private information; Rights and ethical issues when applying AI. Therefore, researching and promulgating relevant legal regulations is a useful step in strengthening consumers' peace of mind.

## 5. Recommendations

Firstly, state management agencies need to coordinate closely to improve policy mechanisms and legal frameworks in banking operations to create favorable conditions and promote creative business models and executive management. In particular, it is necessary to pay more attention to ensuring network security and protecting consumer rights in cyberspace, creating a secure and safe digital transaction environment, preventing and handling fraudulent acts in e-commerce transactions.

Secondly, Government completes the construction of the National Population Database shares this information with a number of service industries including banking to promote digital transformation in the economy and allow the provision of digital services quickly, safely, and conveniently at low costs. In addition, the national credit data system also needs to be built towards a digital

economy. This is the basis for banks to design modern financial products to serve the economy.

Thirdly, Government stimulate the participation in the Vietnamese market of domestic and foreign Fintechs, create conditions for Fintechs to invest, apply and deploy new technological inventions, promote innovation and creativity in the banking sector.

Fourthly, commercial banks need to strengthen cooperation with Fintechs to propose solutions to upgrade and apply modern digital technologies to banking activities such as payments, electronic transfers, credit, customer service ...

Lastly, to strengthen communication and financial education raise people's awareness and understanding of digital technology applications and precautions to avoid risks when conducting transactions on the Internet.

## 6. Conclusion

Vietnam is currently a country with a fairly rapid development in information technology platforms, but the number of online banking transactions and digital payments is still low. Therefore, the digital technology strategy for banking operations in Vietnam is receiving a lot of attention from banks. To be able to take advantage of opportunities and overcome challenges in the digital age requires the efforts of the entire banking industry, Fintech companies, the investment attention of the government, State Banks and, importantly, support from customers.

## 7. References

1. Alkhowaiter WA. Digital payment and banking adoption research in Gulf countries: A systematic literature review. *International Journal of Information Management*; c2020, 53.  
DOI: <https://doi.org/10.1016/j.ijinfomgt.2020.102102>
2. Arjun R, Kuanr A, Kr S. Developing banking intelligence in emerging markets: Systematic review and agenda. *International Journal of Information Management Data Insights*; c2021, 1(2).  
DOI: <https://doi.org/10.1016/j.ijime.2021.100026>
3. Barroso M, Laborda J. Digital transformation and the emergence of the Fintech sector: Systematic literature review. *Digital Business*; c2022, 2(2).  
DOI: <https://doi.org/10.1016/j.digbus.2022.100028>
4. Dung TD. Digital technology ecosystem and foundation of digital transformation. *Scientific journal of Hanoi Metropolitan University*. 2022;56:40-48.
5. Hoe PX. The summary record of the scientific conference of the University of Finance and Marketing: Analyzing business activities of banks and businesses on digital technology platforms, Finance publishing house, Ho Chi Minh; c2021. p. 2-13.
6. Linh T. Notable technology trends in 2021. *Figures and Events Review*. 2021;2:49-51.
7. Phuong NTM, Giang DTT. The impact of technological innovation on the efficiency of Vietnamese commercial banks. *Journal of Science and Technology*; c2021, 50(02). DOI: 10.46242/jst-juh.v50i08.945
8. Politburo. Resolution No. 36-NQ/TW 2014
9. Politburo. Resolution No. 52-NQ/TW 2019
10. State bank of Vietnam. Decision 2655/QD-NHNN 2019
11. State bank of Vietnam. Decision 2738/QD-NHNN 2019
12. Statistics on payment activities.

- [https://www.sbv.gov.vn/webcenter/portal/vi/menu/trangchu/tk/hdtt/gdiam?centerWidth=80%25&leftWidth=20%25&rightWidth=0%25&showFooter=false&showHeader=false&\\_adf.ctrl-state=y2qk4nh33\\_4&\\_afLoop=38302759129392466](https://www.sbv.gov.vn/webcenter/portal/vi/menu/trangchu/tk/hdtt/gdiam?centerWidth=80%25&leftWidth=20%25&rightWidth=0%25&showFooter=false&showHeader=false&_adf.ctrl-state=y2qk4nh33_4&_afLoop=38302759129392466). 2023
13. Thu NT. Top technology trends in 2021. *Topic Technology and digital banking - Banking Review* 2021;1:19-23.
  14. Tuan PA. Results of non-cash payment activities in 2022 and solutions to continue implementing the Non-cash payment development project for the period 2021 - 2025. *Banking Review* 2023. <https://tapchinganhang.gov.vn/ket-qua-hoat-dong-thanh-toan-khong-dung-tien-mat-nam-2022-va-giai-phap-tiep-tuc-trien-khai-de-an-pha.htm>
  15. Vietnam Fintech market report 2022. <https://hyperlead.vn/blog/news/bao-cao-thi-truong-fintech-viet-nam-2022/>. 2023
  16. Vy M. Cloud computing is a reality. *Information and Communications Technology Magazine*. 2010;2:49-52.
  17. Websites of commercial banks
  18. Xuan N, Nga P, Hanh T. Factors affecting the intention to change technology in banking business activities in the 4.0 industrial revolution era in Vietnam. *Journal of Financial and Marketing Research*; c2021;59(5). DOI: <https://doi.org/10.52932/jfm.vi59.59>