**The impact of digital technology on the banking sector in Vietnam**

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**Abstract**

Digital technology, and particularly the 4th Industrial Revolution, has a powerful influence on all facets of social life, with the characteristics of making full use of the omnipresent force of digitalization and information technology. Digital technology, which has played a role as the most competitive area in the economic sector in the implementation of digital technology applications, has had a profound influence on the global banking sector in general and Vietnam in particular. Since the effect of digital technology has changed not only banks' products , services, transaction processes, supply chains and delivery of products and services, but also the way they handle banking, the relationships between banks and customers and competitors have changed. The management process of state departments, the structure of policies and laws must also have several corresponding modifications at a more macro level. Banks, bank customers, state management agencies in the banking sector , in particular the State Bank of Vietnam, are the subjects that have both positive and challenging effects of the digital technology wave, such as the creation of new financial services products in the M-POS banking sector, electronic wallets, chip card technology, mobile banking , internet banking, electronic money, etc.

Therefore, the article will focus on the following: first, an overview of digital technology and the digital trend in the banking sector; second, the advantages and challenges of digital technology in Vietnam's banking sector; third, recommendations for Vietnam 's government agencies , banks and their customers to take up opportunities and address the challenges of the digital era.

**Keywords**: banking sector; digital technology

1. **Digital technology and the digital trend on the banking sector** 
   1. **Digital technology**

The term "digital" comes from Latin, *digitus*, finger, and refers to one of the oldest counting instruments. "It is transformed into numbers when information is processed, distributed or transferred in digital format, as" zeroes and ones "at the simplest machine level. In the context of this chapter, the term refers to technology that relies on the use of microprocessors; hence, computers and apps that rely on computers such as the Internet, as well as other devices such as video cameras, and mobile devices such as cellphones and personal-digital assistants [[3]](#footnote-3).

Nowadays, when talking about digital technology, that is also the fourth industry, since the fourth industry relates to the expansion of economy through the intelligent networking of devices and processes with the assistance of information and communication technology. The fourth industrial system is defined by: (i) more automation than in the third industrial revolution; (ii) a change from a central industrial control system to one where smart products define the production steps; (iv) closed-loop data models and control systems; (iii) a change from a central industrial control system to one where smart products define the production steps.

Digital technology offers the following advantages and challenges: There are also other functional , technical and ecosystem-based problems: problems related to the integration of IT and operational technology; issues of data compliance; risk management and cost reduction in unpredictable times; addressing the complexities of the linked supply chain; deeper understanding of IT and operational technology; and more significantly, how they can be leveraged; changing requirements of consumers and industrial partners; competition; the everlasting human challenge that is extremely important.

In addition, digital technology also brings several of the key advantages, such as: increased efficiency through optimization and automation; real-time data for a real-time supply chain in a real-time economy; greater business consistency through advanced maintenance and monitoring options; better quality products: real-time monitoring, quality assurance facilitated by the Internet of Things, and robotic devices; better working conditions and sustainability; 'new' customer personalization and customization; increased agility; creative capability creation and new revenue models.

**1.2. The digital trend on the banking sector**

Digital technology is pushing changes entirely in the banking sector with digital transformation and fintech.

Firstly, digital transformation entails a long series of associated ripple effects, including digital marketing, payments and analytics, which will shift business models and relationships between banks and their customers. More than just offering web and mobile functionality, digital transformation is about more. Therefore, conventional banking providers need to balance digital pace and ease with human experiences at key moments in the consumer journey that are both thoughtful and compassionate. By protecting personal data, raising accountability, and giving the ability to access funds anytime and anywhere, the digital transformation of the banking sector would offer various opportunities for both banks and their customers for detail:

1. *Artificial Intelligence*. Artificial Intelligence in banking is embodied by chatbots or online assistants who help customers with their problems by providing relevant information or conducting different transactions. Apart from this, Artificial Intelligence could be used for data processing and security purposes. Identify money laundering, for example, within a few seconds by analyzing customer data;
2. *Blockchain.* An improved design, more consistency, and safe data and transactions will benefit from the implementation of blockchain in banking. In addition, blockchain solutions, enabling communication, can make transfers and multiple processes transparent. There will be no need for third-party intermediation, thereby raising the degree of consumer trust. It may also impact cloud technology and switch to decentralized ones, resulting in higher data and fund security;
3. *Internet Of Things.* With real-time data collection, the Internet of Things is beneficial, thereby allowing the consumer experience more intimate, and banks are able to have personally personalized deals. What is more, consumers can make contactless payments easily and seamlessly thanks to wearables. In addition , the Internet of Things is useful for risk control and platform access; biometric sensors can help the authentication mechanism and make access more safe and secured;
4. *Cloud Computing.* Cloud computing is another technology that will make banks more efficient, allowing them the potential to offer more technologies, as well as to increase performance , enhance operations, and instantly deliver products and services. Cloud storage, as well as the Internet of Things, will assist in risk management and create a secure environment for customers and internal banking processes.

*Secondly*, fintechs is partners of banks being tightly focused and significantly faster than banks in innovating new products. The Financial Stability Board defines fintech as “technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions, and the provision of financial services”[[4]](#footnote-4). The areas that fintech covers can be broadly described as: Credit, deposits, and capital-raising services; Payments, clearing and settlement services, including digital currencies; Investment management services (including trading); Insurance. “InsurTech” is the branch of fintech that is dedicated to the insurance sector; Part of the technological backbone of fintech is the Blockchain technology.

1. **The effect digital technology has on Vietnam's banking sector**

**2.1. The benefits of digital technologies to banking sector**

*Firstly,* *for customers*. Many benefits, such as convenience, time-saving and simpler management, have been achieved thanks to digital technology clients:

1. *Convenience for customers*. Personal and business bank accounts are open from every smartphone, so consumers are continuously able to keep track of their account balance and maintain their personal profile details (add new e-mails, phone numbers ...). In the other side, to get checks, there is no need to go to the bank when they can be sent to your email address automatically. In addition, both the appearance of fintech and the competition between fintechs and conventional banks both lead to enhancing the efficiency of consumer banking services. In addition, the use of big data (Big Data) and consumer behavior analysis will improve the quality of customer service. In addition, Internet of Things digital technologies allows the consumer experience to be more intimate, and banks are able to have personally customized deals. For examle: Tien Phong Commercial Joint Stock Bank has successfully implemented the e-Bank package with products such as Internet Banking, SMS Banking and Mobile Banking; Basic features integration is money transfer, account lookup; e-Bank can also act as an e-wallet with the ability to pay bills, top up mobile phones, pay off credit card balances, shop online, and make appointments with the bank..; Vietnam Prosperity Joint Stock Commercial Bank researches and applies big data, Big Data, and cooperates with IBM to build a large database for behavior research, capturing customer choice trends and market trends…[[5]](#footnote-5)
2. *Saving time and money for customers*. Internet banking facilities are available 24/7 during the year, including on weekends, so there is no need to stand in line and wait for the branch to open for those operations to be carried out. In addition, Artificial Intelligence in banking is represented by chatbots or online assistants that can offer unrestricted automated transactions (accept payroll deposits or provide automatic bill payment) without any extra transaction costs, including to foreign financial institutions;
3. *Easy management accounts*. To offer assistance on the current issue, consumers can add details themselves or call online assistants directly. Moreover, payee data is retained within the system, there is no need to re-enter the following payments with data ...

*Secondly, for banks*. Digitalisation in the banking sector opens up a whole world full of possibilities for the institutions as following:

1. *Enhancing the competitiveness of banks and greater efficiency in processes*: Vietnamese banks have helped boost their competition with advanced banks in the country and in the world by improving the use of new technologies and upgrading banking products and services in a new direction. In addition , banks strive to increase the performance of their manual processes with the introduction of various cutting-edge innovations, such as electronic signatures or the development of banking apps for smartphones. In this way, in working with stakeholders, they aim to reduce human mistakes. System digitalization makes very substantial improvements, as both data and signatures are properly collected for the first time;
2. *Narrow technology gap with the world:* Digital technology forces Vietnamese banks to invest and develop technology. In other hand, the progress from the digital revolution will create favorable conditions for Vietnamese banks to have opportunities to attract investment capital and access international markets; updating modern management and business qualifications; acquiring smart digital banking models; technological innovation through the application or transfer of high technology, development of modern banking products and services, bringing into play great potentials in the banking sector and making timely changes with technology trends recently when Vietnam joined the World Trade Organization (WTO) and signed a series of free trade agreements (FTAs), especially the Vietnam - Eurasian Economic Union, or Vietnam FTA. - Korea, FTA Vietnam - Japan ...
3. *Increase in the number of clients*: Process enhancements help banks get more clients. In addition, Vietnamese banks initially approached and extended the availability of sufficient banking goods and services to individuals who currently do not have accounts at a fair cost in remote and isolated areas. According to statistics, the number of individual accounts opened at commercial banks across the country reached about 68.7 million accounts, about 70 commercial banks have provided internet payment services and about 36 commercial banks provide telephone payment services[[6]](#footnote-6);
4. *Cost savings and profit increases*: Through the use of new means of payment and cashless transactions, banks save fee for labour and bussiness. Because Artificial Intelligence with chatbots or online assistants that serve customers will help to reduce the number of banking counters as well as bank staff. In the other hand, the Increase in the number of clients and banking servies. According to the BamBoo Capital Group, by 2018, businesses using digital technology will contribute 44% of the bank's revenue (up from 32% in 2014). The calculation data of AT Kearney business consulting company launched in 2015 also forecasts: By 2020, assets automatically managed by online consultants will increase 68% / year, up to 2,200 billion USD ...[[7]](#footnote-7);
5. *User interface.* Developments in digitalisation have allowed banks to comprehensively enhance user experience and improve omnicanal banking in its evolution into a customer-focused model. This means having solutions for computational technologies to deliver user-tailored products and services. To do this, understanding of their tastes, shopping behaviour and attitudes to risk and financial wellbeing must be taken into account;
6. *Improved evidence-driven decision-making.* As banks become increasingly digitalized, evidence becomes one of the most valuable tools for dynamic decision-making, driven on vast quantities of information accessible to organizations. Technologies like Big Data allow banks to focus their decisions on the data available to their customers or to optimize processes. The advent of big technology firms has lately become a significant obstacle for banks, as they have a larger volume of data and a strong understanding of the technical options they deliver.

*Third, for state management agencies*. Digital technology in the banking sector also brings the state many benefits such as:

1. *Realization of the cashless social policy and cost reduction in cash management in Vietnam*: Under the impact of digital technology, the demand for cash will drop sharply, replacing it with electronic money because traditional banking transactions are being gradually replaced by electronic transactions. Moreover, blockchain technology will replace cash in payment transactions not only in each country but around the world. Blockchain technology allows for the use of tools like “smart contracts,” which could potentially automate manual processes, from compliance and claims processing, to distributing the contents of a will. Besides, digital technology in banking sector has contributed the implementation of the standard of reducing social costs related to cash, reducing the ratio of cash in circulation as a percentage of GDP, cash on total means of payment[[8]](#footnote-8). Because non-cash payments mean that the state can cut the cost of printing money, issuing money and destroying money;
2. *Prevention and fight against corruption, negative and economic crimes*: The development of digital technology applications in the banking sector makes entities in the economy to use cryptocurrencies in most transactions, thus controlling and monitoring transactions of state agencies will be better. This means that criminal acts such as money laundering, corruption, tax evasion ... will be easily detected, prevented, and minimized worse consequences. On the other hand, the easier detection of criminals will also make intending criminals to give up their crimes, thereby reducing economic crimes in general and criminals in the banking sector in particular.

**2.2. The emerging technology problems the banking sector faces**

*Firstly, for customers.* Although digital technology offers many benefits, it lets consumers face emerging challenges:

1. *Security and Identity Theft Concerns*: Due to the Internet Of Things and Cloud Computing Identity computer technology is accessible on the internet, their knowledge can also be stolen by each invidual. In addition , online banking platforms and smartphone applications are typically configured to be safe and banks are increasingly putting in place revised security protocols. No device, however, is fully foolproof and accounts can be compromised, leading to identity fraud via stolen login credentials. There are numerous and nuanced tricks used by cybercriminals, which can be called as follows: (i) *Identity Theft*: Cyber ​​criminals use the method of impersonating another person to create financial fraud. Hackers access a person's personal information and then use the same information to steal identities or access the victim's bank accounts to make transactions or spend; (ii) *Phishing*: Illegal access to the website, using fake emails to get personal information. Commonly used methods such as collecting bank email addresses and sending out a request for information to conduct account security authentication due to some problem (email and spam); creating fake website, payment gateway to "trap" users; account or set up a fake facebook account, send a message to the victim's friends for fraud. The Ministry of Public Security has found that thousands of domestic and foreign cybercriminal groups commit acts of hacker - hacking into accounts or bank cards appropriating hundreds of millions of dollars. In 2018, the whole country had 178 data theft cases, causing damage of more than VND 6.2 billion of 521 cardholders; In the first 6 months of 2019, there were 191 cases, causing damage of 21.8 billion VND of 977 cardholders[[9]](#footnote-9);
2. *Easy but not necessarily faster.* When depositing a check through the mobile app of a bank can take very little time, customers will need to wait for access to their money. Internet banking allows flexibility in terms of the amount of time wasted commuting or waiting in line at a branch location, but all deposits are checked and funds are issued for bank policy entry, which can take up to three business days, depending on the amount deposited;
3. *Lack of Personal Banker Relationship*: Customers will be able to address their general banking needs on their own for the most part. However, if customers don't have a personal friendship with a banker, as problems occur, it may be more difficult to fix the problems. Although online banking websites have customer service teams, before talking to someone who has no understanding of customers’ interests or banking background, customers also need to navigate their way into a phone tree and wait on hold. In addition, a local banker is inspired to represent and improve their personal relationships with their clients;
4. *A restricted service scope.* The types of services they can use are limited, although customers can do quite a bit with an online bank account, such as making deposits, checking accounts and paying bills. Customers may be able to make an initial request to open a new account or to apply for a loan or mortgage, but clients will need to visit a branch to sign paperwork to show identification documents in certain cases. Similarly, even though clients are allowed to move money to a check account or debit card in order to make payments, they would have to visit a branch office or local ATM though they wanted cash.
5. *Overspending Capacity.* The ability to check account balances will possibly cause those individuals to overspend their checking account limits at the spur of the moment. Without a close look at your checkbook or record of uncleared debit transactions, the account balance does not accurately reflect the true sum that you have available*.*

*Secondly, for banks*. Despite many benefits, the digital drawbacks in the banking sector are as follows:

1. *Security and high-tech crime*: Digital technology growth has led to a rise in security gaps, creating circumstances for high-tech criminals and hackers. High-tech criminals also paralyze all bank transactions and attack accounts, counterfeiting cards and stealing customers ' money. Hackers can directly attack the infrastructure of a bank, move money in large amounts. For example: At the end of April 2019, some customers of Bank for Investment and Development of Vietnam lost money because ATM was attacked by a crime of skimming; At the end of October 2018, hackers attacked Vietnam Co-opBank, Hackers hijacked the website and left a message on the website: “The website was hacked by Sogo Nakamoto. I have an entire database of customers using online services, WHM of the bank. You will be able to control all 275,000 online users using ACH (Automated Clearing House) and $ 1.3 billion ”. After the introduction, the hacker announced that he would sell 275,000 customer data for $ 100,000 and the buyer must pay in Bitcoin or Bitcoin Cash; In 2018, about 400 ATM accounts issued by Agribank were hacked and withdrawn at midnight; 20 customers of VietinBank reported that their ATM accounts lost from a few hundred thousand to tens of millions dong even though they did not make any transactions[[10]](#footnote-10).This damages the economy and the reputation of the banks. Therefore, banks need to have highly secure, multi-layered prevention mechanisms in place to prevent attacks, and adopt new ways of defense;
2. *Limitations on Deposits*: Daily or monthly mobile deposit limitations may make it difficult for individuals, but especially businesses to make large deposits online. Once you have reached your designated limit, you'll need to trek to a branch to deposit money. Also, not all types of checks are easily read by computer scanning software. For example, business checks that are handwritten and have a black line on the reverse side to make a carbon record in an account register may be kicked out of the online deposit system, requiring an on-site deposit;
3. *Changing business and governance models*: Business, governance models and payments also need to be reviewed to suit the trends of artificial intelligence management, mobile banking, paperless banking, digital banking, electronic payment. In addition, the future trend, the market economy will exist without the need for traditional banks today, business banks mainly rely on capital mobilization and lending, the size of the region, therefore the bank will also shrink significantly. In addition, the competition between digital banks and financial companies - Fintech technology is becoming more sophisticated and fierce, making banks need to change the appropriate model;
4. *Reducing employees*: The labor market in the banking sector will also change, due to the application of the achievements of this revolution, banks can reduce the number of employees. However, the demand for high quality human resources will increase, requiring employees to be good at both banking expertise and information technology. Moreover, the competition through the expansion of the network of bank branches will gradually cease, due to high operating costs, replacing modern banking technology.
5. *Competitiveness*: Digital technology has enabled Fintechs to penetrate into the banking sector. The growth in operation scale in the context of incomplete regulations has made a big advantage for Fintechs in the race to gain market share with banks. In fact, Fintech has contributed to a profound change in the appearance of the financial and banking industry in Vietnam. According to Ernst & Young's 2018 ASEAN Fintech Overview Survey (one of the top four auditing firms in the world today), Vietnam currently has about 78 Fintech companies operating with total investment capital up to 129 million USD. In particular, up to 90% of payments are in cash and Fintech Vietnam companies focus a lot on the payment sector, accounting for 47% of the total 78 Vietnamese companies, which is a high rate most in ASEAN. Fintech's main products in the banking sector such as: e-wallets, peer-to-peer money transfers, financial information services, peer-to-peer lending, crowdfunding, Bitcoin algorithm ...[[11]](#footnote-11) Meanwhile, banks are facing the risk of downsizing in the provision of smart financial services. In addition, banks are also facing fierce competition among banks. Because they all approach the advancements of the digital era, however banks that grasp the technology first and develop appropriately according to the trend will move forward.

*Thirdly, for state management agencies.* Besides benefits, digital technology make state management agencies faces many problems such as:

1. *Lack of legal framework and policy mechanism*: Many countries, including Vietnam, have not completed the legal structure and policy process for the application of new and modern online and electronic payment systems, payment methods, virtual money, virtual cards, electronic money ... These are new and complex problems that should be further studied, assessed, modified and supplemented to meet the actual requirements. In addition, it is necessary to create a legal environment for Fintech companies to develop and supply digital financial services and products in the right direction. Vietnamese state management agencies have issued a number of guidelines, policies and legal documents to promote the development of science and technology and create a policy framework for state management in the digital era such as: Resolution No. 52/ NQ-TW dated September 27, 2019 on a number of guidelines and policies for active participation in the fourth industrial revolution; Resolution No 50/NQ-CP dated April 17, 2020 introducing government’s action program on poliburo’s resolution No. 52/ NQ-TW dated September 27, 2019 on a number of guidelines and policies for active participation in the fourth industrial revolution; Decision No. 34/QD-NHNN dated January 7, 2019 promulgating the banking action program for implementation of the stratgy for developing the Vietnam’s banking industry by 2025 with vision towards 2030… However, these guidelines, policies and legal documents just take role of direction and common foundation for state management in general and the banking sector in particular in the digital age. These guidelines, policies and legal documents need to be detailed in the coming time to create a complete legal framework for the State to manage the banking sector in a digital age. Because the delay in innovation or the lack of a synchronous legal framework for digital technology management in the banking sector by state management agencies may prevent and slow the innovation of commercial banks in the applying digital technology to create new products.
2. *Difficulty in inspection and supervision*: The rapidly development in digital technology put new requirements in designing new policy frameworks to manage and monitor the new elements of the zone for many countries, including Vietnam, such as: crypto currency, e-money, Fintech companies ... For detail: control of cash flow, risk in payment and safe operation of the whole system in the trend of increasingly developing non-banking and underground banking activities, posing a great challenge for the State Bank of Vietnam in licensing management, monitoring operations as well as controlling cash flow payments from these institutions. In addition, the transforming inspection and supervision from mainly based on on-site inspection to risk-based surveillance based on remote monitoring based on big data analysis technology, connecting Online monitoring of some major performance indicators of credit institutions to promptly handle risks and insecurity is also a big challenge.
3. *For information technology and telecommunications infrastructure*: The bad connection, the interrupted Internet make difficult for customers to access the utilities of the bank's modern financial products and services. Moreover, payment infrastructure in Vietnam is not evenly developed and completed. Vietnam's payment system still has an undocumented component, which is limited in technology and transaction processing time. Currently, financial institutions (including banks, payment intermediaries and e-wallets) have built their own payment equipment system at a point of payment, so they are wasteful. New forms of payment such as QR Code, biometrics ... have begun to develop but have not yet been planned and evaluated for widespread deployment. Therefore, in order for banking service deployment to be convenient and efficient in business, it is necessary to develop synchronously information technology and telecommunications infrastructure.
4. **Commentary**

In order for Vietnam to accept the advantages and overcome the difficulties brought by technology in the banking sector, it is very necessary to the efforts of the state agencies as a legal framework, Bank as the executable owner and all customers, as follows:

*Firstly, for customers.* To protect themselves against the loss of information and money, each customer absolutely does not provide information related to OTP, bank password or account information to anyone and by any means (texting, answering the phone, directly disclosing ...); avoid accessing untrusted websites, links or opening files of unknown origin; carefully check information in transactions, be alert to calls to provide information; Log out of the account at the end of the transaction, do not choose to save the login password on shared devices, public computers. Customers also need to prioritize the use of personal computers, regularly upgrade and protect devices by installing anti-virus software, setting up new generation firewalls, downloading application software from clear sources, regularly update information for the bank when there are changes such as phone number, identity card ... Do not use a password that is too short and related to personal information, such as date of birth, phone number ... Don't use one password for all bank accounts. In addition, customers should not leave a large amount in the ATM card or set the lowest credit limit possible; Actively deactivate the service when there is no need to use it and reactivate it when needed; register for the bank's messaging service to promptly capture arising transactions; closely coordinating with the bank's customer care switchboard, with the police to prevent cybercrime, and handle arising risks.

*Secondly, for banks*. In order to enhance competitiveness, take benefits and overcome emerging technology problems in the digital age, banks need to do the following:

1. *For network security*. Banks need to invest in security and security solutions, regularly inspect and supervise the compliance with security and confidentiality regulations; detect and promptly handle security gaps; improve financial capacity, banking governance, especially risk management. Ensuring the confidentiality of customer information, ensuring safety of customers' assets. The security must be done from the awareness of each bank employee, therefore, banks need to guide and train employees to understand their responsibilities to the bank. At the same time, banks need to link together to create a common security system for payment operations because this activity is high connected in the system and the high cost of setting up a security system. The uniformity and consistency of the banks contributes to improving the security in the banking industry. In addition, banks can limit data when all of the bank's stored data on clouds can be theft limited by developing a storage data backup center. Moreover, banks should warn customers to be cautious when dealing with e-banking.
2. *For employee resources.* Banks need to develop human resource development strategies, focusing on: innovating, enhancing training of high-tech human resources; increase the ability to apply information technology, build a contingent of qualified and ethical staff. Besides, through recruitment, appropriate remuneration to attract high quality human resources, especially human resources with information technology and system control. For traditional human resources, it is necessary to refine, re-arrange, train, retrain, to meet the requirements of implementing, operating and controlling the operation of digital banks. Some countries have been very successful with their investment in manpower strategies, such as Singapore's comprehensive adult training and exercise strategy; Finnish future readiness foundation education strategy; the frameworks and standards for expanding private sector education in India; Comprehensive approach to the apprenticeship system in Germany and Switzerland ...[[12]](#footnote-12)
3. *Technology development*: In order to keep up with the trend of rapid and modern technology development, banks need to prepare strong financial resources to invest in modern technology platforms and upgrade compatible equipment systems. Once a new technology foundation is available, a bank must improve or build a new core banking system to suit the current requirements. Banks should select a company specializing in banking technology with international experience to complete this core system in the direction of digital banking in accordance with the conditions in Vietnam.
4. *Cooperation with Fintechs*: The cooperation with Fintechs helps banks take advantage of the lean business model, exploit the advantages of strong risk management, and create strength synergize in service provision, bring practical benefits in terms of cost reduction, increase utility, and convenience for customers and effectively contribute to financial universalization in rural, remote and isolated areas. In fact, Vietnamese banks have done this. For example: Vietcombank continuously expanded cooperation with service providers, Fintech companies, payment intermediaries (Vnpay, Momo ...) in many fields such as health, public administration, transportation, electricity. , water, tuition ... in accordance with the Government's orientation on non-cash payment[[13]](#footnote-13).
5. *For products and services*: Banks need to improve and complete their current products and services and supplement the portfolio of products with high technology content to meet customers' requirements. Furthermore, banks need to increase the collection, analysis and exploitation of customer data from the application and deployment of new and breakthrough technologies such as big data analysis, artificial intelligence, and data sharing... thereby, capturing behaviors, preferences, understanding customers' needs and desires to enhance experience, creating customer satisfaction and engaging with customers. In addition, banks need to design and sell competitive packages of products and services to attract more customers.
6. *Business model.* Banks need to formulate appropriate business models. Accordingly, the bank needs to build a business model in the direction of serving customers best to attract customers to use banking products and services. The bank also needs to clearly define the right direction in each stage and also need to quickly adjust its business strategy to accommodate the constant changes in the business environment
7. *The transaction method.* The technology wave is very strong, therefore banks needs to change the way of providing products and services to customers to suit the new requirements. Bank sneeds to strongly develop digital transaction channels for customers to interact and transact with the bank without going to the transaction counters, creating the most favorable conditions for customers.

*Thirdly, for state management agencies.* In the role of policy framework and infrastructure establishment, state management agencies need to do the following for the Vietnamese banking industry to best adapt to the impact of digital technology:

1. *Completion of law*. Reviewing, amending and supplementing current legal documents in the direction of facilitating the application, transaction and development of digital technology products in the banking sector. Because, the legal framework and policy mechanism related to new electronic and online payment services need to be revised and supplemented in time according to the rapid development of digital technology. On the other hand, new complex issues such as the advent of virtual currencies, virtual cards, electronic money, ... need to be studied to improve the legal basis for transactions using currencies. In addition, it is necessary to create a legal environment for Fintechs to develop and supply digital technology products and services in the right direction. In fact, the Governor of the State Bank of Vietnam has also established a Steering Committee on Fintech, in which the State Bank of Vietnam Payment Department is assigned to be the standing agency, assisting the Steering Committee. The Steering Committee has the following tasks: submitting to the Governor of the State Bank of Vietnam for approval of the annual program; advised the Governor on solutions to improve the ecosystem, including completing the legal framework to facilitate the development of Fintech businesses in Vietnam, in accordance with the main guidelines and directions of the Government; submitting to the Governor for decision on important issues related to Fintech such as the strategy / plan to develop the Fintech field in Vietnam...[[14]](#footnote-14) Moreover, in Vietnam, there are still many legal documents when being issued, the products, the activity has not been launched yet and therefore there are points that are not relevant to the development trend.
2. *Completion of institutions*. The completion of institutions should focus on the following issues: Unifying the concept and understanding of digital technology products based on international practice and current legal system. Consensus of interpretation is important for reviewing relevant legal documents, as well as assigning management responsibilities to relevant ministries and agencies; Issue a controlled trial legal framework. The sandbox needs to meet the criteria before and after a product-activity is put into the sandbox. In fact, on August 8, 2018, the Prime Minister issued Decision No. 986 / QD-TTg approving the "Development Strategy of Vietnam's banking industry to 2025, with an orientation to 2030", in which assigning tasks to the State Bank of Vietnam in implementing the new policy testing mechanism (sandbox format); Specifically: (i) Research and develop a Project on experimental management mechanism for Fintech operations in banking operations; (ii) Study on a pilot mechanism to manage peer-to-peer lending. On that basis, the State Bank has also issued the Information Technology Application Plan of credit institutions for the period 2017 - 2020 with specific objectives, roadmaps and solutions to guide credit institutions in investing and completing improve information technology infrastructure for the application of advanced technologies since the Industry 4.0; The action plan of the banking sector on strengthening the capacity to access the Industry 4.0 to 2020 and orientations to 2025 as well as the action program of the banking sector to implement the Vietnam Banking Industry Development Strategy to the year 2025, with a vision to 2030.
3. *For inspection and supervision*: Digital technology has made banking changes significantly, so the State Bank needs to renovate inspection and supervision activities to ensure that The banking system develops sustainably in the digital age. In addition, the State Bank should focus on ensuring security and safety in banking operations, especially in the field of electronic payment, due to strong impacts from digital technology. At the same time, State agencies need to actively apply digital technology to inspect and supervise the banking system towards automation and / or use of artificial intelligence. This helps to increase the transparency and efficiency of the banking sector's operations.
4. For information technology and telecommunications infrastructure: The Government should have policies to develop synchronous information technology and telecommunications infrastructure, ensure the security of the national financial network, increase the confidentiality of information data for the banking system in order to cope with these negative impacts from digital technology such as: In order to upgrade and complete infrastructure for digital technology development, the State needs to soon establish a national electronic identity infrastructure, in line with international practices and can be accepted in international transactions; State regulators should actively digitize their services and digitize management processes when possible; Enhancing the capacity of the National Cyber ​​Security Center; Broadband upgrade.
5. *For public services*: Currently, the rate of payment for public services using cash in Vietnam is still much higher than other countries in the region and countries with the same or less developed level in the world. This can be quickly changed if the State applies new payment technologies to payment for public services. In long term, this can also help reduce and save budget. In addition, the state should direct state-owned enterprises and groups, especially businesses and groups that are providing public services to facilitate and adopt mechanisms to encourage people to use new payment.
6. *For state officials*: Professional officers of the State Bank should be trained to ensure they are capable of applying information technology, advanced working methods, and have the capacity to propose and advise on construction. strategies, orientations, policies, regimes and regulations on state management of financial, monetary, credit and banking market operations in accordance with the requirements of the economy in terms of economic integration extensive internationalization.

It can be seen that digital technology brings many benefits to customers, banks and state management agencies, most notably convenience and development. However, digital technology also poses many great challenges such as information security and safety for customers and banks, an insufficient legal corridor for state management agencies. Therefore, in order for Vietnam to overcome difficulties and receive the benefits of digital technology, it is necessary to have a system of synchronous solutions, with the cooperation of banks, state management agencies and bank customers.

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