

IMPACTS OF REVOLUTION 4.0 ON VIETNAMESE COMMERCIAL BANKING SYSTEM: SITUATION AND SOLUTIONS

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Abstract: *The technology revolution 4.0 has dramatically changed the economic structure, consumption habits, and activities of every economy. In particular, the presence of technology 4.0 in the banking system is indispensable and has had a profound impact on business activities, product ranges, administration structures and risk management at each commercial bank. Meanwhile, the legal framework - both theoretical and practical - is always backward and slow compared to the development of technology and practice. This paper analyzes the impact and challenges of technology 4.0 on risk management of commercial banks, on state management and risk monitoring (at both institutional and state management levels) and recommends policies and solutions to improve the legal framework, encourage the commercial banking system to develop healthily and sustainably.*

Keywords: *technology revolution 4.0, technology 4.0, 4th wave of technology, Fintech, risk management, financial supervision.*

1. Concepts and principles of Industrial Revolution 4.0

a) Concepts

The concept of Industry 4.0, or the Fourth Industrial Revolution, was first mentioned in the “High-tech strategic action plan” approved by the German government in 2012. According to Prof. Klaus Schwab, Chairman of the World Economic Forum, Industry 4.0 (Industrie 4.0 in German), or the Fourth Industrial Revolution, is the term that includes a range of modern automation technologies, data exchanges and inventions. Industrial Revolution 4.0 is defined as “a term for the technologies and concepts of an organization in the value chain” along with cyber-physical systems, the Internet of Things (IoT) and the Internet of service (IoS). The essence

of Industrial Revolution 4.0 is based on digital technology and integrates all Smart technologies to optimize production processes and methods; emphasizing the technologies that have been having the greatest impacts such as 3D printing technology, biotechnology, new material technology, automation technology and artificial intelligence.

b) The main principles of Industrial Revolution 4.0

There are four principles established for Industrial Revolution 4.0, which support the identification and implementation of Industrial Revolution 4.0 scenarios, including: (i) Connectivity. Machines, devices, sensors and people can connect and communicate with each other via the Internet (IoT or IoP); (ii) Information transparency. Thanks to Internet connection, the amount

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of information connected and shared is huge and transparent. Technology 4.0 can enable information systems to create a virtual copy of the physical world by enriching digital models with sensor data; (iii) Technical assistance. The support systems manage to support people in gathering and displaying information to make decisions and solve urgent problems on a short notice. Control systems can provide physical support for humans by addressing a range of states such as irritability, fatigue, or insecurity; (iv) Creating artificial intelligence (AI) to assist in making better decisions in business, consumption and other activities in life. Technology 4.0 helps connect, collect a large amount of information and form Bigdata, based on which physical control systems can analyze rules, make choices and choose the best decisions/solutions. Such decisions as automated communication platforms, automatic credit rating, etc. are called artificial intelligence.

2. Practices of Industrial Revolution 4.0, its application in Vietnam's financial system and commercial banks

At present, the impact of Industrial Revolution 4.0 on Vietnam's financial system is mainly in two areas: digital currency (virtual currency) and Fintech product supply companies.

a) Speculating virtual money in the mode of "multi-level financing" and using virtual money as a payment instrument

In Vietnam, cryptocurrencies appear in many forms, such as offline cryptocurrencies (prepaid cards, smart cards), online money (electronic wallets), Bitcoin, etc.; among which, Bitcoin is a virtual currency having attracted the most investors' attention. According to unofficial statistics, Vietnam is known as one of the Top 5 countries with a large number of Bitcoin and other virtual money

players. Some individuals, companies and institutional groups issue their own currency as a channel to raise capital. However, investing in cryptocurrencies is risky because it only owns an encryption in cyberspace. The form of investing in virtual money has the nature of "multi-level ponzy system financing" as it creates a virtual bridge to attract investors and then the virtual currency issuers will "borrow" the virtual money and / or own the virtual currency from cryptocurrency miners, virtual money owners and those who buy virtual money ownership in the future (like buying an apartment which has not been built yet) in the future. When lending virtual currency / or future virtual money ownership, the owners will immediately receive an interest, while retaining that virtual currency.

In Vietnam, virtual currency is neither a currency nor a legal payment instrument. However, investing in projects for developing, speculating, digging and using virtual currencies for payment still arise. Huge defaults due to virtual currency investments have occurred in Vietnam, adversely affecting social stability, the real economy and financial markets. Some departments and authorities have also officially issued written recommendations that investors should explore investment opportunities thoroughly; and individuals, organizations and businesses with an intention of issuing ICOs should consult lawyers on applicable legal matters cautiously.

b) Application of Fintech in Vietnam's financial systems

Fintech's potential in Vietnam is huge and almost untapped. Vietnam has a young population structure and good Internet infrastructure with 44% using the Internet and a proportion of 40% using

smartphones, which is expected to increase sharply in the following years. The middle class in Vietnam is growing fast. Nielsen Vietnam forecasts that Vietnam's middle class will have nearly tripled from 13 million to 33 million by 2020, reaching the highest growth rate in Southeast Asia. On the contrary, the coverage of financial services is still very low, with only 30% of the population having a bank account (only 16% in rural areas). A very low percentage of people use other financial services, such as insurance, participation in the stock market, asset management, etc.

Currently, the number of Fintech startups in Vietnam is small, with about 40 companies, most of which focus on payment. Fintech operating model is mainly the cooperation between Fintech companies and banks to provide consumers with products and services. In addition, a number of P2P loan service providers have appeared on the technology 4.0 platforms. According to the statistics of Topica Founder Institute, in 2016, the total value of Fintech startup deals in Vietnam was 129 million USD, accounting for 63% of the total value of startup businesses.

Until now, the legal framework for Fintech in Vietnam has put primary emphasis on some regulations in payment field. The State Bank, which is mandated by the government as the standing agency of Fintech, is making great efforts to finalize the legal framework and Fintech ecosystem, including Fintech startups, investment funds, finance–telecommunication infrastructure and regulatory agencies.

3. Impact of Industrial Revolution 4.0 and risks to stability on the banking system

3.1. Some major impacts of Industry 4.0 on the banking system

a) The financial-banking system will be affected by the appearance of virtual currencies, which can create significant impacts on financial security and macro stability:

- The development of Bitcoin as well as other digital currencies (hereinafter referred to as virtual currencies) not issued by the Central Bank will force the Central Banks of countries to change management methods of monetary policy to be adaptable due to the economy's ability to influence the money supply. Central banks also face the risk of falling into a dollarization situation, as virtual currencies can make forex trading much simpler. Services like PayPal or e-gold make it easier for people of a country to convert their money into a stronger currency. Virtual currency also pushes the financial system to currency risks due to its erratic price.

- In addition, virtual currencies can create instabilities in monetary security and macro-stability: (i) As a means of money laundering; when virtual currencies are traded, they can be exchanged with real money. Then virtual money becomes the perfect means for international criminal organizations to launder money. When invested in virtual money, or even registered to mine, bought and sold in accounts (called wallets), dirty money from corruption, weapon-trading, drugs, money stolen from properties, credits, etc. automatically becomes clean money, a legitimate source of income; (ii) Being a speculative medium; cryptocurrencies have become a speculative means in Vietnam, many tens of thousands of billion dong failures have occurred in the past few years due to speculation in virtual currencies; (iii) Digging cryptocurrency consumes a huge amount of electrical energy, causing more environmental disasters.

b) *Impact on the organization and management pattern of financial institutions in the financial system.* AI technology, or artificial intelligence, is a technology that simulates humans' thinking and learning processes for machines, especially computer systems. AI technology has been applied in many areas of life, including banking and financial systems.

Accordingly, artificial intelligence can have an impact on the banking industry in aspects, for instance, financial institutions can use AI to assess credit quality, prices and insurance contracts and automatically interact with customers; Investment funds and brokers can use AI to seek higher profits and optimize transactions, etc. Through the advent of AI, banks' administration model has also changed. Banks can also apply AI in management of risk portfolios, customers and database, which is more accurate and faster than humans. With self-learning ability and adaptability, the potential of AI is not limited to applications. Therefore, the requirements for the banking industry in the future are to grasp trends and apply AI methods of working and controlling to ensure safe and effective banking operations.

c) *Industrial Revolution 4.0 will completely change distribution channels and traditional financial products and services and customers' experience is gradually becoming a dominant trend.* Advances in technology are changing the structure, patterns of operation and providing many modern services of the banking system, forming new financial products and services, such as M-POS, Internet banking, Mobile Banking, chip card technology, electronic wallets, P2P, etc., creating favorable conditions for people to use modern banking services and save transaction costs.

Over the last 10 years, the advent of smartphones has changed the way people communicate and interact, leading to changes in distribution channels, sales networks and the design of products and services of banks, internet sales channels, mobile banking, tablet banking, social media, digital banking development, and paperless transactions are a strong development trend. In particular, the use of technologies such as web-chat and Skype is increasing.

d) *Industrial Revolution 4.0 creates a trend of "paperless banking" becoming popular, which will be a significant challenge for the banking industry in reducing the role of branches.* Branches no longer play an important role and will not be the most profitable distribution channels in the future. Competition through the expansion of the network of bank branches will gradually cease, due to high operating costs, and be replaced by modern banking technology. Customers will no longer come to branches as much as they did, which means the bank will have to find a transactional method that can connect with the new behaviors of some customers.

e) *Industrial Revolution 4.0 will create great competition in the fields of financial services and banking, such as peer-to-peer lending, payment services in the context of financial technology enterprises - Fintech increasingly expanding and developing.* According to the survey, the assessment of PwC (one of the four leading auditing companies in the world today), in the next 3 to 5 years, the total global investment in Fintech could exceed 150 billion USD. Accordingly, the market share of financial services providers in the market will gradually shrink; fierce competition to get customers between commercial

banks and technology companies is an inevitable trend.

f) *The development of telecommunications infrastructure in the context of Industrial Revolution 4.0 has posed new security challenges, so network security becomes extremely important.* With the rapid development of digital technology and the trend of cloud computing, security holes have thus increased, which leads to increasingly serious concerns about the risk of hacking attacks. In many cases, some individuals and organizations may collect others' personal information and publish it online.

g) *The labor market in the financial sector will also change.* The application of the achievements brought by the revolution can significantly reduce the number of employees at banks, financial institutions and security companies (especially with the IT department, branch transactions, etc.). However, the demand for high-quality human resources will increase (those who are good at professional expertise in finance, banking and information technology).

3.2. Risks to banking system stability

The nature and scope of risks of banks in particular and the financial system in general will have certain changes due to the involvement of technology 4.0 in the system in the form of new financial products and services and new business models in the industry. These changes will naturally lead to the arising risks of the system, but they will also provide opportunities for customers, banks, systems and supervisory agencies.

- *Risks to customers* are the leakage of customers' personal and financial information security.

- *Risks of commercial banks:* (i) risks of changing business strategies

due to new technologies creating new financial services products and new business models; (ii) operational risks that require governance with third-party partners are increasing (suppliers of technology products and services 4.0, etc.), and the increasing interaction among banks in the system also lead to an increase in operational and governing risks; (iii) cyber risks and compliance risks may arise in the event that the bank fails to protect customers' rights and the confidentiality of customers' information as required by the legal framework; (iv) risks of money laundering may arise and careful monitoring measures are required; (v) liquidity risks and credit risks to financial services and products applying technology 4.0, such as Fintech products.

- *Risks and challenges to the State Bank (SBV):* The SBV's main objectives are to stabilize the monetary market through monetary policies, use tools to pump money and regulate capital flows. However, the technology revolution 4.0 has brought new means of payment on a global scale, which could create a new challenge for the SBV because monetary policy management tools may no longer be effective: (i) *Digital currency has become a means of payment but it is still out of SBV's control.* When paying for foreign currencies without borders and being difficult to control, it may lead to exchange rate risks, foreign currency liquidity risks, and the risk of dollarization rising beyond the SBV's control; (ii) *Cryptocurrencies can also become a money laundering tool* that is hard to control because virtual transactions can take place; (iii) *Cryptocurrencies can also become a speculative tool used as a financial product*, which may be a major challenge for the SBV in increasing the efficiency of mobilizing idle capital from the residential areas for the system of credit

institutions. As a speculative product, the digital currency itself is not in the risk control of any system, has no tangible value, so the value of the digital currency fluctuates erratically, which results in huge risks to speculators and creates social disturbance.

- *Risks and challenges to supervisory agencies (including the SBV):* Supervisory agencies cope with the following challenges: (i) *Monitoring the size and tracking transactions* related to the investment, speculation and payment with digital money technology from domestic individuals' and organizations' accounts; (ii) *The emergence of new business models and new financial products also create additional challenges for supervisory authorities in adding these subjects to the list of necessary risk monitoring.* Designing tools to measure risks of this object (internal risks in the operation of the object, cross-risks with other institutions and organizations, risks of infection with other areas of the economy): measurement criteria, thresholds, warning tools,...

However, in order to fulfill the above two supervisory tasks, it is necessary to complete the legal framework for bringing Fintech products, new relevant business models into supervision, licensing, withdrawal, sanctions on reporting (reporting information, reporting frequency) in order to establish a monitoring database, well-perform on-site monitoring tasks, and remotely monitor risks that may arise.

4. Recommendations and solutions

Firstly, it is necessary to complete the legal framework soon to manage and monitor the new business models and financial products well, monitor the cash flow of investment, speculation on digital money products or new means of payment and speculation generated by technology

4.0. For example, up to present, the legal framework for FinTech in Vietnam has still been simple, mainly stating some regulations in the payment field. The State Bank has been assigned by the Government to be the standing agency of FinTech, (i) *Efforts are being made to finalize the legal framework and Fintech ecosystem*, including FinTech start-ups, investment funds, investment, finance and telecommunication infrastructure, and regulatory agencies, (ii) *To enable Fintech to be present in other available sectors of the market* such as credit, deposits, investment management, etc; and (iii) *Identify common standards for the application of digital technology, and promulgate a testing legal framework for new technology products and financial services.*

Secondly, research has been carried out to develop a financial inclusion system development strategy. For example, the State Bank has been assigned by the Government to be the focal point in formulating the National Strategy on financial inclusion and will coordinate with relevant ministries and branches in establishing a National Steering Committee on financial inclusion. In the course of financial inclusion implementation, it is necessary to apply financial technology like Fintech and consider Fintech as one of the factors contributing to the success of the financial inclusion Strategy. Vietnam's viewpoint is to encourage Fintech development so that Fintech can be present in other vacant areas of the market, such as credit, deposits and investment management.

Thirdly, relevant state agencies and financial institutions should study and develop modern models of management, administration and business, applying new technologies appropriate for the development of financial market with the

strong impact of Industrial Revolution 4.0, especially paying much attention to risks.

Fourthly, both relevant state management agencies and financial institutions should focus on training and retraining cadres qualified enough to adapt to the new transition.

Fifthly, it is important to strengthen coordination and information sharing between the management and supervisory agencies, between these agencies and

financial institutions in supervising activities, ensure secure transactions and prevent high-tech crimes as well as money laundering activities.

Finally, it is recommended to actively disseminate, educate, update knowledge and information of market situations and give timely warnings to the subjects related to the banking sector such as consumers and investors./.

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TÁC ĐỘNG CỦA CM 4.0 ĐẾN HỆ THỐNG NHTM VIỆT NAM: THỰC TRẠNG VÀ GIẢI PHÁP

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Cuộc cách mạng công nghệ 4.0 làm thay đổi mạnh mẽ cấu trúc kinh tế, thói quen tiêu dùng, sinh hoạt của mọi nền kinh tế tiếp nhận nó. Trong đó, sự hiện diện của công nghệ 4.0 trong hệ thống ngân hàng là tất yếu khách quan, tác động sâu sắc đến hoạt động kinh doanh, dòng sản phẩm, cấu trúc quản trị và quản trị rủi ro tại mỗi NHTM. Trong khi đó, khuôn khổ pháp lý – trên cả lý thuyết và thực tiễn – luôn lạc hậu và chậm chạp so với sự phát triển của công nghệ và thực tiễn. Bài nghiên cứu này phân tích tác động, thách thức của công nghệ 4.0 tới quản trị rủi ro của NHTM, tới quản lý nhà nước và giám sát rủi ro (ở cả cấp độ định chế và quản lý nhà nước) và khuyến nghị chính sách, giải pháp nhằm hoàn thiện khuôn khổ pháp lý, hỗ trợ hệ thống NHTM phát triển lành mạnh, bền vững.

Từ khóa: Cách mạng công nghệ 4.0, công nghệ 4.0, làn sóng công nghệ thứ 4, fintech, quản trị rủi ro, giám sát tài chính.

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