Journal of FINANCE & ACCOUNTING RESEARCH

EDITORIAL OFFICE
No. 58 LE VAN HIEN, BAC TU LIEM DISTRICT - HA NOI

Phone: 024.32191967
Email: tapchinctckt@hvtc.edu.vn
Website: https://tapchitckt.hvtc.edu.vn/
https://tapchitckt.hvtc.edu.vn/?language=en-US

MACROECONOMICS AND FINANCE

STUDY EXCHANGE

CORPORATE FINANCE

INTERNATIONAL ECONOMICS AND FINANCE

Printed at Statistical Publishing House - Publishing Lisence: 487/GP-BTTTT date 28/10/2016
Prints and deposits completed in April, 2024.

Tạp chí Nghiên cứu TÀI CHÍNH KẾ TOÁN

TÒA SOẠN
SỐ 58 LÊ VĂN HIỀN, Q. BẮC TỪ LIÊM - HÀ NỘI

Điện thoại: 024.32191967
E-mail: tapchinctckt@hvtc.edu.vn
Website: https://tapchitckt.hvtc.edu.vn/
https://tapchitckt.hvtc.edu.vn/?language=en-US

KINH TẾ, TÀI CHÍNH VĨ MÔ

NGHIÊN CỨU TRAO ĐỔI

TÀI CHÍNH DOANH NGHIỆP

KINH TẾ VÀ TÀI CHÍNH QUỐC TẾ

In tại Nhà xuất bản Thống kê - Giấy phép số: 487/GP-BTTTT ngày 28/10/2016
In xong và nộp lưu chiểu tháng 4 năm 2024.

ECONOMIC SITUATION OF THE WORLD AND VIETNAM IN 2023 SOME PROSPECTS FOR 2024

PhD. Do Thi Dien*

Abstract: ***The world economic situation in 2023 has outstanding features such as low and uneven growth, gradually decreasing inflation, continuing trade stagnation, major currencies moving in opposite directions, the private sector facing many difficulties with a sharp increase in bankruptcies, and a decline in global investment. There is also a capital shortage for green investment, stemming from the world situation with many fluctuations. The economy is still suffering from the impacts of the Covid-19 pandemic, the unstable political situation with the Russia-Ukraine conflict, and the recent clash between Hamas and Israel. It is forecasted that in 2024, the economy will continue to recover, but growth will still be uneven among countries and regions. For Vietnam, the economy is expected to improve in 2024, but there are still many potential challenges.***

• Keywords: *economy, trade, inflation,....*

JEL codes: G30

Date of receipt: 28th December, 2023

Date of receipt revision: 12th March, 2024

Date of delivery revision: 02nd January, 2024

Date of approval: 25th March, 2024

1. Characteristics of the world economy in 2023

1.1. Growth is low and uneven, inflation is gradually decreasing

Faced with continued political instability, global growth expectations have declined compared to expectations. Inflation and living costs remain high.

According to the IMF, global economic growth will from 3.5% in 2022 to 3.0% in 2023 and continue to decline to 2.9% in 2024, lower than the historical average. is 3.8% from 2000 to 2019 (IMF 2023). The EU forecasts global economic growth in 2023 to reach 3.2%, adjusted up 0.1 percentage points compared to the forecast in May 2023 (Gentiloni 2023). According to data from the World Bank (WB), global growth will only be 2.1% in 2023 (although adjusted up 0.4 percentage points compared to the forecast at the beginning of 2023); Developed economies will grow by only 0.7% of GDP and developing and emerging market economies will reach 4% of GDP.

The risk of falling into an economic recession in developed economies continues to increase at a significant rate, dropping from a growth of 2.6% in 2022 to 1.5% in 2023 and further decreasing to 1.4% in 2024. This is mainly due to the impact of tightening monetary policy measures aimed at curbing inflation. In contrast, emerging and developing economies are expected to experience less severe economic contractions. Forecasts indicate that this group of countries will see growth rates decrease from 4.1% in 2022 to 4.0% in both 2023 and 2024.

Table 1: World economic growth in 2023 and prospects for 2024 (%)

Region	2022	Expectations 2023	Outlook 2024
World	**3.5**	**3.0**	**2.9**
Developed countries	**2.6**	**1.5**	**1.4**
America	2.1	2.1	1.5
Euro area	3.3	0.7	1.2
Virtue	1.8	-0.5	0.9
France	2.5	1.0	1.3
Italy	3.7	0.7	0.7
Spain	5.8	2.5	1.7
Japan	1.0	2.0	1.0
Older brother	4.1	0.5	0.6
Canada	3.4	1.3	1.6
Other developed countries	**2.6**	**1.8**	**2.2**
Emerging and developing countries	**4.1**	**4.0**	**4.0**
Emerging and developing Asian countries	**4.5**	**5.2**	**4.8**
China	3.0	5.0	4.2
India	7.2	6.3	6.3
Vietnam	8.0	4.7	5.8
Emerging and developing European countries	**0.8**	**2.4**	**2.2**
Russia	-2.1	2.2	1.1
Latin America and the Caribbean	**4.1**	**2.3**	**2.3**
Brazil	2.9	3.1	1.5
Mexico	3.9	3.2	2.1
Middle East and Central Asia	**5.6**	**2.0**	**3.4**
Saudi Arabia	8.7	0.8	4.0
Sub-Saharan Africa	**4.0**	**3.3**	**4.0**
Nigeria	3.3	2.9	3.1
South Africa	1.9	0.9	1.8
Emerging and middle-income countries	**4.0**	**4.0**	**3.9**
Low-income developing countries	**5.2**	**4.0**	**5.1**

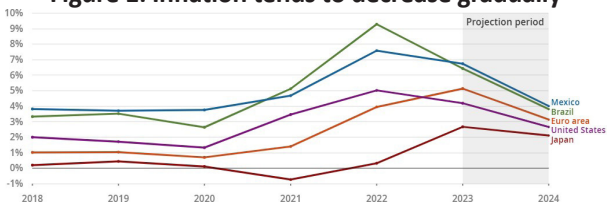
Source: IMF 2023

Inflation is expected to decrease from 8.7% in 2022 to 6.9% in 2023 and continue to decrease to 5.8% in

** Thuongmai University; email: tiendien@tmu.edu.vn*

2024, due to the impact of combined tightening of monetary policy with countries' efforts to stabilize commodity prices being effective.

Figure 1: Inflation tends to decrease gradually



Source: IMF 2023

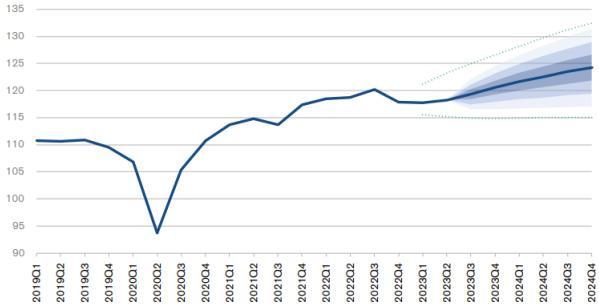
Most major central banks will continue to maintain tight monetary policy in 2023 until core inflation is under control. The goal of normalizing fiscal policy to make public investment a driver of economic growth will also remain an important policy option in many countries, even though overall public debt levels remain high.

1.2. Trade continues to stagnate

The IMF estimates that world trade growth is expected to decline from 5.2% in 2022 to only 0.9% in 2023, before improving to 3.5% in 2024 (IMF 2023), which is lower than the average of 4.9% in the period 2000-2019. The trade slowdown reflects falling global demand, an increasing mix of domestic services, the lagged impact of the US dollar appreciation, and rising global trade barriers. At the same time, this reflects the combined and strong impact of the shift in consumer demand, the strengthening of the USD, and the increase in trade barriers on global trade today. The global trade balance is still seriously imbalanced due to commodity prices remaining at high levels for a long time. In the medium term, this imbalance can be gradually controlled. However, global investment positions reached historic lows in 2022, reflecting high levels of risk in the eyes of global investors.

The WTO has reduced its global trade growth forecast for 2023 to 0.8%, which is much lower than the previous forecast. However, production and business activities in the third quarter of 2023 are expected to grow more positively than in the previous quarter, with the growth rate of industrial added value estimated at 4.57% compared to the third quarter of 2022 (WTO 2023). The weakness in trade appears to be widespread, affecting a large number of countries and a wide range of goods, particularly in certain manufacturing categories such as iron and steel, office and telecommunications equipment, textiles, and clothing. One notable exception is passenger cars, whose sales increased sharply in 2023. The exact cause of the weakness is unclear, but inflation, high interest rates, the appreciation of the dollar, and geopolitical tensions are all contributing factors.

Figure 2: Quarterly global trade growth from Q1/2019 - Q4/2024



Source: IMF 2023

Risks to the forecast include an unexpectedly sharper weakness in China and a resurgence of inflation in advanced economies, which would require sustained high-interest rates over the long term. On the other hand, growth could also outperform expectations if inflation falls rapidly, allowing for an early exit from restrictive monetary policy. In total, the risks to the current outlook are seen as balanced between positives and negatives, although there could be some additional upside potential due to a lower base in 2023. WTO economists see some signs in the data of trade fragmentation related to geopolitical tensions, but so far, there is no evidence of a more severe globalization trend that could exert greater pressure on trade.

1.3. Main currencies fluctuate in opposite directions

In 2023, there was a strong increase in the USD compared to other major currencies such as EUR, GBP, CNY, JPY, and AUD, especially in the last months of the year. This is mainly due to political instability and the FED's maintenance of high-interest rates.

Figure 3: DXY index developments in 2023

Source: Trading Economics 2023

However, there have also been de-dollarization efforts from Russia and China. This is not just an idea discussed at the BRICS Summit in South Africa in August 2023. Recent data from the Russian Ministry of Economic Development shows that the CNY has surpassed the USD in import payments by Russia since

their collaboration in 2022. Since then, the CNY has been used in Russia's trade with Mongolia, Taiwan (China), the Philippines, Malaysia, Saudi Arabia, Thailand, Japan, Tajikistan, and Singapore. These changes reflect Russia's shift away from transactions in the currencies of 'unfriendly countries' amid sanctions. Minister Reshetnikov also commented that Russia-China trade turnover could exceed the target of 200 billion USD and reach about 220 billion USD by the end of 2023 (Ha 2023).

The Japanese yen (JPY) significantly increased earlier this year, reaching 130 JPY per 1 USD after a period of depreciation throughout 2022, occasionally falling to nearly 152 JPY per 1 USD - the lowest level in 32 years. The surge in JPY at the beginning of the year was fueled by expectations that the Japanese central bank would adjust monetary policy. However, towards the end of the year, the JPY lost more value and reached 150 JPY/1 USD.

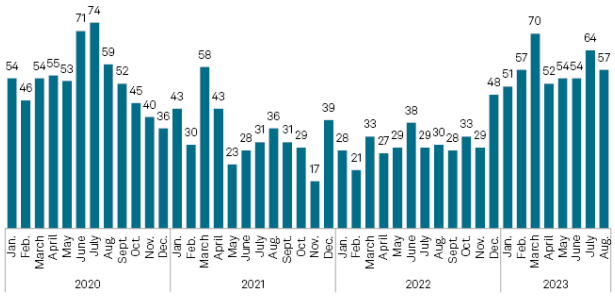
Regarding the EUR, after hitting its lowest point on July 18, 2023, at 1.12 Euros for 1 USD, the currency is currently below the 1.06 USD mark due to increased retail trade data. The robust strength of the US and the ongoing conflict in the Middle East have boosted demand for the USD.

It is important to note that currency fluctuations are influenced by various factors such as economic policies, political events, and market sentiment. In the immediate future, the USD will likely remain at a high level until the end of 2023.

1.4. The private sector faces many difficulties: The number of bankruptcies increased sharply

In 2023, the United States is expected to experience the highest number of business bankruptcies since the COVID-19 pandemic in 2020. Even in the last months of 2023, this wave of bankruptcy is growing faster and stronger.

Figure 4: Monthly number of bankrupt businesses in the US as of September 2023



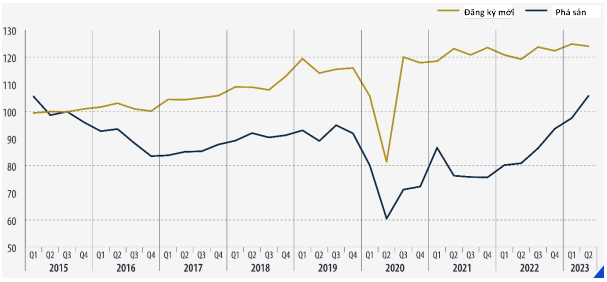
Source: S&P Global 2023

The number of bankruptcy filings in the US continued to increase in September 2023, at the same rate as in 2020, potentially making it the worst year for corporate bankruptcies in over a decade. There have been 516 bankruptcy filings in 2023 as of September, surpassing the total for the entire years of 2021 and 2022 (S&P Global 2023). In August alone, 57 companies filed for bankruptcy protection.

While the total was lower than July's 64 filings, it was still significantly higher than most months in the previous two calendar years. In 2023, several high-profile businesses, including retailer Bed Bath & Beyond and trucking company Yellow Corp, faced bankruptcy.

Not only in the US, but the number of bankrupt businesses in Europe is also on the rise. In the second quarter of 2023, the number of businesses declaring bankruptcy in the EU increased for the 6th consecutive quarter. Compared to the previous quarter, the number of bankrupt businesses increased by 8.4%, reaching the highest level since data collection began in 2015 (Eurostat 2023). Regarding the number of newly registered businesses, after increasing by 2% in the first quarter of this year, the number decreased slightly by 0.6% in the second quarter of 2023. In general, since 2023, the number of newly registered businesses has been higher than the 2015-2022 period.

Figure 5: Number of newly registered and bankrupt businesses in Europe compared to 2015 (2015 = 100 points)



Note: ___ New registration, ____ bankruptcy

Source: Eurostat 2023

By the end of 2023, business bankruptcies in Europe are expected to increase more than at the beginning of the year. Industry groups such as Accommodation and Food Services (+23.9%), Transportation and Warehousing (+15.2%), Education, Healthcare, and Social Activities (+10.1%) have witnessed the highest number of bankruptcies in the second quarter of 2023 compared to the previous quarter. The largest increase in bankruptcies today, compared to the fourth quarter of 2019, was recorded in Accommodation and Food Services (+82.5%) and Transportation and Warehousing (+56.7%).

Among the 27 members of the European Union (EU), Hungary recorded the largest increase in the number of businesses declaring bankruptcy (40.8%), followed by Latvia (24.8%) and Estonia (24.6%). In

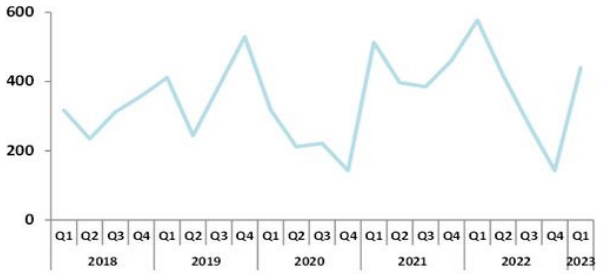
contrast, the number of businesses declaring bankruptcy decreased sharply in Cyprus (48.5%), Croatia (23.6%), and Denmark (15.9%) (Phuong 2023).

1.5. Global investment decline, capital shortage for green investment

UNCTAD's World Investment Report 2023 reveals the growing annual investment deficit facing developing countries as they strive to achieve the Sustainable Development Goals (SDGs) by 2030 The gap is now about 4 trillion USD per year - up from 2.5 trillion USD in 2015 when the SDGs were adopted.

The report shows that global foreign direct investment (FDI) is set to fall by 12% by 2022 and analyzes how investment policy and capital market trends impact investment in the SDGs, especially clean energy. Developing countries need to invest in renewable energy about 1.7 trillion USD per year, but will only attract 544 billion USD in FDI in clean energy by 2022. Despite investment in renewable energy has nearly tripled since 2015, but most of the money has flowed to developed countries.

Figure 6: Global FDI flows by quarter as of Q1/2023 (Billion USD)



Source: OECD 2023

According to OECD, preliminary estimates in the first quarter of 2023, global FDI capital flows have tripled compared to the lowest level in the past 5 years recorded in the fourth quarter of 2022, reaching 440 billion USD. However, compared to the same period last year, global FDI inflows are still 25% lower than the level recorded in the first quarter of 2023.

2. Characteristics of Vietnam's economy in 2023

In 2023, amidst numerous difficulties, challenges, complexities, and abnormalities in the global and domestic situations, Vietnam is poised to remain a bright spot in the overall economic landscape, continuously enhancing its international position.

Entering 2023, Vietnam benefits from the solid economic recovery witnessed in 2022. It has emerged as the fourth-largest economy in ASEAN and the 40th largest in the world, showcasing a dynamic and open environment. The country holds a high position in international trade, ranking within the world's TOP 20, and is placed 30th in the list of the world's most powerful nations. Vietnam's Artificial Intelligence (AI) readiness index is ranked 55th globally and stands at 6th out of 10 in ASEAN. Furthermore, Vietnam secures the 7th position out of 30 in the Asia-Pacific region on the 2IPD Integrated Postal Development Index in the 2022 Status of Global Postal Development Report by the Universal Postal Union (UPU), which comprises 174 member countries as announced in October 2023.

In 2023, amidst numerous challenges and complexities in both the global and domestic landscapes, Vietnam is anticipated to maintain its position as a bright spot in the global economy while continually improving its international standing.

As of the beginning of the year, Vietnam boasts several key achievements from its robust economic recovery in 2022. Notably, it has secured the position of the fourth-largest economy in ASEAN and the 40th-largest globally, showcasing dynamism, openness, and high international trade scale. Additionally, Vietnam ranks 30th among the world's most powerful nations and holds the 46th position in the Global Innovation Index, a two-place increase from 2022.

The country's national brand value has reached 431 billion USD, ascending to the 32nd position among the world's 100 strongest national brands.

According to Klaus Schwab, President of the World Economic Forum, Vietnam stands out as a beacon of economic growth post-COVID-19, thanks to its comprehensive approach to macroeconomic management.

Vietnam's foreign affairs activities are expected to be vibrant in 2023, marked by significant events such as the signing of the Free Trade Agreement (FTA) with Israel, the launching of negotiations on the Comprehensive Economic Partnership Agreement with the United Arab Emirates (CEPA), and concluding negotiations on the first international IPEF Supply Chain Agreement within the Indo-Pacific Economic Framework for Prosperity (IPEF).

With upgraded relations between Vietnam and the United States to a comprehensive strategic partnership, the country has now established such partnerships with all countries in the United Nations Security Council's Standing Committee and the G20.

Despite the challenges, the government remains committed to various programs, including the Recovery Program and national target programs. Economic growth, although slightly below the target, is estimated to surpass the world average, reaching over 5% in 2023. The country has witnessed a significant increase in newly registered businesses,

stable agricultural development, and a vibrant tourism and service sector.

The disbursement of public investment capital has increased, contributing to the commencement and completion of essential infrastructure projects. The state budget revenue is expected to meet or even exceed planned targets.

While inflation is estimated to increase by 3.5%, social investment capital has grown by 5.9%, and total import-export turnover has exceeded 700 billion USD, resulting in a trade surplus of about 15 billion USD.

However, in 2023, some growth drivers are expected to slow down, facing challenges such as a decrease in export and import turnovers, potential risks in real estate and corporate bond markets, and increased bad debt. Achieving the 5-year average growth target remains under pressure, and several economic challenges persist, requiring focused attention on policy implementation, economic restructuring, and fostering innovation.

3. World and Vietnam economic outlook in 2024

The world economy is expected to continue to recover in 2024 after facing significant challenges in the last few years. However, growth prospects remain uneven across countries and regions. Advanced economies such as the United States, the Euro Area and Japan are forecast to grow at moderate rates, while emerging and developing economies are expected to achieve relatively strong growth than. The World Bank forecasts global economic growth of 2.1% in 2024 for developed economies, 0.7% for developing economies and 1.2% for developing economies. with America.

It is expected that global inflation will stabilize in 2024 but remain much higher than before the pandemic. Supply-demand imbalances, lingering supply chain constraints and uncertainty about food and energy prices will maintain inflationary pressures due to supply-driven costs. Tightening monetary policy in developed economies will also take time to fully control inflation. Risks from wage-price chains remain high in some countries. The central bank may continue to pursue a policy of prioritizing inflation control over growth. Global financial conditions could stiffen in 2024.

World trade growth is expected to slow from 5.1% in 2022 to 0.9% in 2023, before rising to 3.5% in 2024, well below the average of 4.9 % in the period 2000-2019 (IMF 2023). Over the long term, trade fragmentation alone, the separation of countries into blocs that only trade with each other, could reduce annual global GDP by up to 7% (IMF 2023). Increasing geo-economic fragmentation will also hinder multilateral cooperation in providing important public goods, such as combating climate change and future pandemics as well as ensuring energy security and food.

For Vietnam, the World Bank forecasts that the Vietnamese economy will grow by 4.7% in 2023 and will recover to 5.4% and 6% in 2024-2025. On a more optimistic level, many international organizations forecast GDP growth in 2024 to be higher than the World Bank's figure. Specifically, Standard Chartered made the highest forecast at 6.7%. HSBC Bank forecasts that Vietnam's GDP will increase by 6.3%. Units forecasting Vietnam's GDP growth in 2024 at 6% include: United Overseas Bank, Asian Development Bank and UOB Bank. Actual results in 2023 depend on Vietnam being able to seize opportunities and overcome challenges. These opportunities and challenges can include:

Regarding opportunities: (i) China's policy of reopening the economy helps improve supply chain conditions, positively impacting Vietnam's export industries such as agricultural products, metals, minerals, tourism... ; (ii) Pressure on exchange rates gradually decreases as major economies reduce the intensity of monetary tightening, creating conditions for reducing interest rates, supporting businesses and the economy; (iii) Oil and raw material prices cool down, supply chain disruptions improve, reducing inflationary pressure; (iv) Thanks to multinational corporations accelerating the China + 1 Strategy to adapt to geopolitical changes due to the impact of strategic competition between great powers, Vietnam is one of the countries in an area that benefits from continuing to be an attractive destination for quality foreign investors.

Regarding challenges: (i) Weak world economic prospects cause global demand for Vietnamese exports to decline; (ii) The Russia-Ukraine, Israel-Hamas conflicts are prolonged, tensions show no signs of cooling down; (iii) Electricity prices will be adjusted to increase in 2024, which will put pressure on inflation as well as hinder growth (cost push effect); (iv) Business operations face difficulties in a high interest rate environment; (v) Difficulties in the real estate and corporate bond markets cannot be resolved as investor confidence takes longer to restore and legal problems take time to resolve.

References:

Bonderud, Douglas. "Cost of a data breach 2023: Financial industry impacts." Security Intelligence, 2023.
E&Y. "EY projects India to become a US$26 trillion economy by 2047 with a six-fold increase in per capita income to US$15,000." EY India, 2023.
Eurostat. "Q2 2023: Business bankruptcies at highest level since 2015." Eurostat, 2023.
Gentiloni. "Remarks by Commissioner Gentiloni at the press conference on the Summer 2023 Economic Forecast." European Commission, 2023.
IMF. World Economic Outlook, October 2023: Navigating Global Divergences.
International Monetary Fund, 2023.
Isige, John. "Crypto Hacks And Scams Reach Nearly a Billion Dollars In 2023."
Techopedia, 2023.
OECD. "Foreign Direct Investment Statistics: Data, Analysis and Forecast" 2023.
S&P Global. "August adds 57 more US corporate bankruptcies; 2023 total tops prior 2 years." S&P Global, 2023.
Trading Economics. "United States Dollar." Trading Economics, 2023.
WTO. "Global Trade Outlook and Statistics Update: October 2023." WTO, 2023.
Ha, Thanh. "Quá trình phi USD hóa thương mại của Nga với Trung Quốc gần hoàn tất." Lao Dong, 2023.

CURRENT SITUATION OF AGRICULTURAL PRODUCTS EXPORT - FACTORS AFFECTING VIETNAM'S AGRICULTURAL PRODUCTS EXPORT

PhD. Dong Thi Ha* - Doan Nhat Quang

Abstract: ***Researching, assessing the current situation and clarifying factors affecting Vietnam's agricultural exports, in order to propose appropriate solutions, has great significance both theoretically and practically for the situation, current situation of Vietnam. First, the study conducts a comprehensive review, synthesis, and thorough analysis of empirical studies in the field of Vietnam's agricultural exports. This includes reviewing previous research, analyzing statistical and numerical data, and assessing important factors affecting the development of the agricultural export industry. Second, the research article systematizes a series of important theoretical issues about agricultural products and agricultural export. It analyzed and interpreted the factors affecting Vietnam's agricultural exports based on an approach from the gravity model. This helps to better understand the process of exporting agricultural products, from the production process to bringing products to international markets. Third, the study analyzes the current status of Vietnam's agricultural exports over the period from 2000 to 2021. This includes focusing on the important achievements that Vietnam's agricultural industry has made achieved in expanding agricultural exports, as well as remaining limitations. Analyzing both the successes and limitations of Vietnam's agricultural exports during the above period has helped clarify the current situation and lay the basis for proposing solutions to promote agricultural exports in the future. This has important implications in orienting Vietnam's agricultural industry and facing challenges and opportunities in the next period.***

• Keywords: *exports, agricultural products, influencing factors, gravity model, economic growth,...*

Date of receipt: 02rd December, 2023
Date of receipt revision: 02rd January, 2024
Date of delivery revision: 04th December, 2023
Date of approval: 03rd January, 2024

1. Introduction

The export of agricultural products from Vietnam has become an important component of the country's economic development. With its long history and vast agricultural area, Vietnam has gradually established a reputation and reputation in the international market for its agricultural product export industry. From rice, coffee, cashews, pepper to vegetables and seafood, Vietnam has a wide variety of products and fierce competition on the list of leading countries in the agricultural and food industries.

The export of agricultural products not only plays an important role in providing income for millions of farmers and agricultural workers, but also is a key factor in balancing Vietnam's international trade. In recent years, the rapid development of the industry has witnessed significant growth in agricultural product exports, making Vietnam one of the leading agricultural product exporting countries in Southeast Asia and the world.

2. Literature review

2.1. Theory of agriculture

From paul's perspective

According to the 2006 Codex Alimentarius - Organically Produced Foods of the Food and Agriculture Organization (FAO) of the United Nations, agricultural products refer to any product or commodity, whether raw or processed. Used for human consumption (excluding water, salt, and additives) or animal feed.

From WTO's perspective

The Agreement on Agriculture (AoA) of the World Trade Organization (WTO) defines agricultural products as all products listed in Chapters 1 to 24 (excluding fish and fish products), as well as certain products in other chapters of the HS coding system. All remaining products in the HS tax law are considered non-agricultural products (also known as industrial products). Therefore, agricultural products include a wide range of commodities derived from agricultural activities, such as:

Basic agricultural products, such as rice, wheat, flour, milk, live animals, coffee, pepper, cashews, tea, fresh vegetables, etc.

* *National Economics University; email: dongha.neu@gmail.com*

Derivative products such as bread, butter, cooking oil, meat, etc.

Products made from agricultural products such as confectionery, products from milk, sausages, soft drinks, wine, beer, cigarettes, cotton fibers, raw animal skins, etc

An important point of the WTO's perspective is that agricultural products do not include fisheries, forestry, and match products, which is different from the WTO's view.

From Vietnam's perspective

The regulated agricultural products include those from agriculture, forestry, fisheries, and the salt industry. Specifically:

- Agricultural products from the agricultural sector: rice, corn, potatoes, cassava, coffee, pepper, pork, meat, and poultry egg, etc…

- Agricultural products from the forestry sector: harvested wood, timber, bamboo, turpentine, sealants, mangroves, etc…

- Agricultural products of the fishery industry: shrimp, fish, sea fish, snails, oysters, mussels, lilacs, etc…

- Agricultural products of the salt industry: salt production.

Based on previous analysis, it can be seen that each organization has a different understanding of agricultural products.

The differences in industrial and product classification and ranking between countries and international organizations such as the World Trade Organization (WTO) and the Food and Agriculture Organization (FAO) may lead to differences in measuring and reporting the value of agricultural production and exports. Classifying candy, soft drinks, wine, beer, lactose, and other items as one country's industry and classifying them as another country's agriculture may reflect differences in industry management and classification. This may lead to inconsistent reporting of agricultural product values between countries and international organizations. Similarly, Vietnam categorizes the fishing, forestry, and matchstick sectors as agricultural sectors, which international organizations do not recognize, may also lead to inconsistent reporting and evaluation of Vietnamese agricultural products. This may lead to differences in agricultural product statistics and evaluation data between Vietnam and international organizations, thereby affecting the comparison and evaluation of agricultural performance. This work requires consensus and common understanding between parties to resolve inconsistencies in the classification and reporting of industries and agricultural products. Synthesizing from the above perspectives, the concept of agricultural products can be given as follows: "Agricultural products are products of agricultural production activities, including finished products or semi-finished products obtained from plants and animals, or the growth of crops and livestock, but does not include the products of the forestry and fishery industries."

2.2. Theory of agricultural export

Agricultural export can be understood as the activity of a country selling its agricultural products to other countries for profit purposes. This process typically involves the use of currency as a means of payment, where agricultural products are exchanged with currency or different forms of financial payments. This helps agricultural exporting countries to leverage their production advantages and generate income from the international market.

The export of agricultural products is not only related to the trade of agricultural products with other countries, but also involves the utilization of natural advantages and international division of labor. This is an important trade process where a country sells its agricultural products on the international market through market relations. This helps them leverage geography, labor, and other factors to create profits and competition in the world market. In the increasingly complex trade situation, from e-commerce to intermediary payments and related financial services, agricultural product exports increasingly require professionalism and competitiveness.

This indicates that agriculture is a broad and complex concept that depends on the classification and ranking of each country or international organization. Therefore, in this article, we will focus on some specific agricultural products in the crop group to deepen our understanding of the specific aspects of agricultural products in this research field.

Form of exporting agriculture product

Agricultural product exports are undergoing diversification, typically focusing on the following three main forms:

Direct export

This is a form of agricultural product export where stakeholders, namely sellers and buyers, interact directly through face-to-face meetings, exchange information through letters or phone calls, discuss products, prices,

and other transaction conditions. One advantage of this form is that it can generate higher profits than other forms, as there is no need to pay fees to intermediaries. In the context of modern international trade, direct sales can also help establish credibility by ensuring product quality and meeting buyer needs. However, this form requires agility in updating market information, prices, and potential risks such as payment delays or exchange rate fluctuations.

Export intermediaries

This is a form of international sales of agricultural products supported by third-party intermediaries. The intermediary will receive funds from the sales. The common intermediaries in international trade are agents and brokers. Although this form of payment to intermediaries may help reduce the seller's profits, it is often widely used, especially in developing countries. Intermediaries usually have a better understanding of the market, including the needs, flavors, and characteristics of the product, in order to gain opportunities for higher returns.

Re-export

This form involves exporting agricultural products purchased from one country and then re-exporting them to another country without the need for processing in the country of origin. The goal of re-export is to purchase agricultural products at a cheaper price in one country, and then sell them at a higher price in another country to obtain a greater return than the initial investment.

These forms represent the diversity of agricultural product exports and depend on many factors, including market opportunities and the business strategies of related enterprises and individuals.

The benefits of exporting agricultural products

In recent years, many countries around the world have proven that implementing export-oriented policies can help them overcome poverty, become new industrialized countries, and have a strong modern economy. And have the ability to compete with developed countries in the future. Therefore, exports have become an important component of many countries' economies and an important tool for promoting economic growth and development.

In the field of agricultural product exports, it plays an important role and accounts for a considerable share of the total value of commodity exports in many countries around the world. However, this proportion may vary due to differences in national advantages, including capital, labor, technology, natural conditions, and government policies.

The export of agricultural products has a series of benefits for a country's economic development:

Important contributions to economic growth

Exports, including agricultural products, play an important role in a country's economic growth. Compared to imports (M), an increase in exports (X) may increase Gross Domestic Product (GDP).

Promote economic structural transformation

Exporting agricultural products can promote the transformation of a country's economic structure. It can promote diversification of production, encourage the development of other economic sectors, and create new employment opportunities.

Improving the living standards of employees

Exporting agricultural products may attract more workers to enter the industry with higher incomes, thereby improving their lives. However, in order to master technology and improve the quality of labor, workers need to enhance their skills and qualifications.

Maintain economic stability

The export of agricultural products can help a country maintain economic stability under difficult circumstances. When other sectors are in trouble, the agricultural sector is usually more stable and can help improve the overall economic situation.

Promoting international economic relations

Agricultural product exports are an international activity that can promote the development of other international economic activities, including finance, insurance, transportation, and technology transfer. Entering the international market through exports can provide opportunities for countries to utilize foreign capital and technology to develop agricultural production and improve labor productivity.

Improve the management mechanism and policies

The export of agricultural products promotes the improvement of national economic policies and management mechanisms to comply with international regulations and promote exports.

In summary, agricultural product exports not only have economic significance, but also have a positive impact on the social and sustainable development of countries around the world.

2.3. Theory of Factors Influencing Exports

Gravity Model is a theory in the field of international trade based on the laws of physics about the gravitational force between objects of different masses. The development of this model is to explain why some countries engage in more trade and trade

scale than others. The following is the theoretical basis and development of gravity models.

Theoretical foundation of model

The gravity model has evolved from the specialization of manufacturing. When each country has special advantages in commodity production, specialization occurs, such as technological differences (David Ricardo's theory), abundant production factors (Herschel Olin's theory), or increased efficiency of scale (new trade theory).

However, these theories cannot explain why the scale of trade varies among countries. The gravity model was born to solve this problem.

Development and improvement of models:

The gravity model has been widely used to quantify the impact of factors on international trade flows.

The first researchers to apply gravity models to this field were Tinbergen (1962) and Poyhonen (1963).

This model uses Newton's law of universal gravitation in physics, where the gravitational force between two objects is proportional to their mass and inversely proportional to the square of the distance between them.

The gravity model equation applied in international trade has the following form:

$$Tij = A * \frac{(Yi * Yj)}{Dij}$$

Meanwhile:

Tij is the total foreign trade flow between country i and country j.

Yi and Yj are the economic scale of two countries i and j (usually measured by GDP or GNP).

Dij is the geographical distance between countries i and j.

A is a constant.

The gravity model helps to quantify the impact of these factors on international trade flows and has been widely used in international trade research. The initial gravity model quantified and evaluated the impact of three fundamental factors: the economic size of exporting and importing countries, and the gap in trade volume between the two countries. Then, further research based on this model expanded and added other factors. The impact on commodity trade between the two countries not only depends on their economic size (usually expressed in GDP) and geographical distance. This depends on many other factors, such as the population size of the two countries, exchange rate policies, policies related to trade barriers, and the gap in economic development levels between the two countries.

3. Summary of factors affecting agricultural product exports

In recent years, both globally and in Vietnam, many studies have used gravity models to evaluate the factors affecting commodity exports, especially agricultural product exports. However, this study typically occurs in different temporal and spatial contexts, leading to the identification of diversity in influencing factors, which may result in the repetition or heterogeneity of factors in each study model.

The following table will outline the factors that affect agricultural product exports.

Summary of factors affecting agricultural product exports in previous studies

Variables	Impact trend	Author/Year of Research
GDP of exporting country	+	Nguyen Tien Dung (2011), Idsardi (2010)
GDP of importing country	+	Nguyen Tien Dung (2011), Idsardi (2010)
Population of exporting countries	-	Nguyen Tien Dung (2011), Yang and Martínez-Zarzoso (2014)
Population of importing countries	-	Nguyễn Tiến Dũng (2011), Yang and Martínez-Zarzoso (2014)
Openness of the exporting country's economy	+	Hatab và cộng sự (2010)
Exchange rate	-	Idsardi (2010), Pham Hong Tu and Hoang Thi Ngoc Lan (2005)
Common border	+	Yang and Martínez-Zarzoso (2014)
Inflation	-	Tran Thi Bach Yen và Truong Thi Thanh Thao (2017)
The geographical distance between countries	+	Lehman et al (2007)
Participate in the WTO	+	Nguyen Van Hung (2013)
Participate in the AFTA	+	Pham Hong Tu and Hoang Thi Ngoc Lan (2005), Do Thi Nha Hoa

Note (-) Impact in the opposite direction (+) Impact in the same direction

Some conclusions have been drawn

One of the common methods for analyzing the factors that affect agricultural product exports is to use gravity models. This model helps to evaluate the impact of various factors on agricultural product exports. However, in this analysis process, three basic elements are indispensable: the GDP of the exporting country, the GDP of the importing country, and the geographical distance between the two countries.

The export of agricultural products usually depends on the population of the exporting country, the population of the importing country (the number of people involved in production), and the inflation rate of the exporting country. When a country and an importing country share certain common

characteristics, such as having a common border, their agricultural exports usually become more favorable.

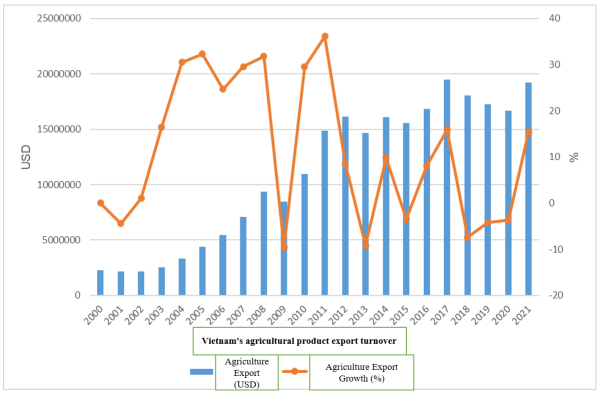
Joining a free trade zone or economic cooperation group as a member country has important advantages in exporting agricultural products to other member countries of the organization. Specifically, this helps to reduce import tariffs and trade barriers, creating a fair and healthy competitive environment for member countries. This promotes trade freedom and provides opportunities for the country's agricultural products to enter international markets more effectively.

In summary, due to the diversity of methods and the focus on different aspects of exports, research using gravity models can help identify key factors affecting the export of agricultural products from participating countries. Factors such as GDP, population, per capita GDP, economic openness, exchange rates, geographical distance, common borders, common language, and participation in international organizations are crucial in shaping the export patterns of each country. However, it is important to note that due to the unique nature of different natural and socio-economic conditions, the impact of these factors may vary in each country. Understanding how these factors interact and affect agricultural product exports is crucial for formulating appropriate policies and strategies to promote imports and exports and develop the agricultural economy.

4. Overview of Vietnam's agricultural product export activities

In recent years, Vietnam's agricultural exports have become an important component of the national economic system and have made significant contributions to the development and balance of the national budget. Vietnam has vast land area, abundant agricultural labor force, and favorable natural conditions, gradually demonstrating its competitiveness in the international market by exporting high-quality agricultural products. This has promoted the development of the agricultural sector, increased the income of farmers, and also helped improve the lives of millions of Vietnamese people. However, in addition to opportunities and achievements, the agricultural export sector also faces many significant challenges in maintaining and sustainable development. In this section, we will gain a deeper understanding of the development and current situation of Vietnam's agricultural product exports.

4.1. Vietnam's agricultural product export revenue



WB source and author's calculation

In the past decade, Vietnam's agricultural exports have significantly increased, marking an important step forward in the contribution of the agricultural sector to the national economy. The annual turnover reaches billions of dollars, and the agricultural export sector has become one of the pillars of Vietnam's economy. The diversity of product portfolio, from rice, coffee, cashews, peppers to vegetables and marine food, has helped Vietnam penetrate the international market and establish a reputation for product quality.

From 2000 to 2021, Vietnam's agricultural exports showed significant fluctuations in export value and annual growth. Here are some comments on Vietnam's agricultural product exports:

Volatility growth: During this period, agricultural product exports experienced severe fluctuations. Some years have seen significant positive growth, such as a growth of 16.46% in 2003 and 30.57% in 2004. However, there have also been negative growth years, especially in 2009 with a growth of -9.57% and 2018 with a growth of -7.44%.

Period fluctuations: Vietnam's agricultural exports have experienced significant fluctuations, with strong growth years such as 2004 and 2011, and significant growth years such as 2009 and 2018. This fluctuation may be influenced to some extent by domestic factors such as international market conditions, policies, and agricultural productivity.

The impact of global events: As mentioned earlier, global events such as the 2008 global economic recession and the 2020 COVID-19 pandemic may have a significant impact on Vietnam's agricultural exports that year.

Potential and challenges: These data also demonstrate the potential of Vietnam's agricultural sector and agricultural product exports, but also

highlight challenges such as climate change, international market competition, and the need to maintain stable and sustainable growth.

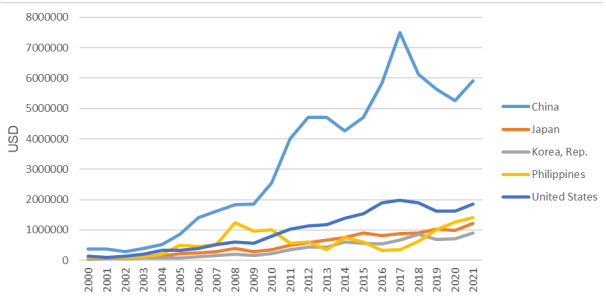
In summary, Vietnam's agricultural exports have achieved significant growth in the past period, but careful management is needed to harness their potential and address current and future challenges.

4.2. Vietnam's agricultural exports to a number of countries

In the context of international integration and increasingly competitive markets, Vietnam has continuously improved product quality and expanded export markets. These efforts have helped bring Vietnamese agricultural products to many countries around the world.

The following is an analysis of Vietnam's agricultural exports to the five largest partner countries in 2021. We will conduct in-depth research on important agricultural products, export value, and factors affecting exports from 2000 to 2021.

Export Vietnamese agricultural products to major partners



WB source and author's calculation

China

During this period, China has always been the largest and most important market for Vietnamese agricultural exports. The total export value of agricultural products to China has increased from approximately 376 million USD in 2000 to nearly 5.92 billion USD in 2021.

The strong growth of China's agricultural exports may be mainly due to the increasing demand for imported agricultural products and food in China.

The expected growth in exports of agricultural products to China will be attributed to the growing demand for imported agricultural products and food in China.

United States

The United States is also an important market for Vietnamese agricultural exports. The total export value to the United States increased from approximately 140 million USD in 2000 to nearly 1.85 billion USD in 2021.

The United States is an important market for exporting agricultural products such as cashews, coffee, and other related products from Vietnam.

This market usually requires strict compliance with food quality and safety, so it is very important to comply with international standards when exporting agricultural products to the United States.

Philippines

Vietnam's neighboring country, the Philippines, is also an important market for agricultural exports. The total export value to the Philippines increased from approximately 103 million USD in 2000 to nearly 1.41 billion USD in 2021.

The Philippines is a neighboring country that often imports various agricultural products from Vietnam, such as rice, cashews, and fruits.

Trade agreements and ASEAN partnerships between the two countries can play an important role in promoting agricultural exports.

Japan

Japan is an important market for many agricultural products, especially seafood, fruits, and vegetables. The total export value to Japan has increased from approximately 83 million USD in 2000 to nearly 1.22 billion USD in 2021. Attention to food quality and safety is crucial for agricultural product exports to Japan.

Korea, Rep.

South Korea is also an important market for Vietnamese agricultural exports. The total export value to South Korea increased from approximately 43 million USD in 2000 to nearly 906 million USD in 2021. South Korea is also an important market for many agricultural products, especially processed products.

Free trade agreements and strengthening diplomatic relations may promote agricultural exports to South Korea.

Overall, Vietnam's agricultural exports to these countries demonstrate product diversity and important partnerships in the Vietnamese agricultural sector. Vietnam needs to maintain and improve product quality, comply with international standards, promote trade relations, and take advantage of future export opportunities.

4.3. General evaluation of Vietnam's agricultural product exports

Vietnam's achievements in exporting agricultural products

Since 2000, Vietnam's agricultural exports have made significant progress. Vietnam has become one of the world's largest exporters of agricultural products. Here are some highlights of Vietnam's achievements in agricultural product exports during this period:

Export growth: During this period, the export value of Vietnamese agricultural products continued to increase. This includes products such as rice, coffee, seafood, cashews, pepper, etc. Vietnam exports agricultural products to many markets around the world.

Market diversification: Vietnam has sought and developed many new export markets, while resisting the position of traditional markets. This helps to reduce the risk of major market fluctuations.

Rice and coffee: Vietnam has become one of the world's largest exporters of rice and coffee. This product has made a significant contribution to the export value of agricultural products in the country. In 2022, rice reached 7.1 million tons with a revenue of 3.46 billion USD , coffee reached 1.78 million tons with a revenue of over 4 billion USD.

Organic and quality certification: Vietnam has invested in the development of organic agricultural product production and ensured that agricultural products meet international quality standards. Vietnam has developed the production of organic and certified agricultural products, including organic rice, organic coffee, and ASC certified seafood (Fisheries Management Committee).

International cooperation: Vietnam has participated in many regional and free trade agreements, which helps to create greater export opportunities and improve its competitiveness in the international market. Vietnam has participated in many free trade agreements, including the Comprehensive Progressive Agreement for the Trans Pacific Partnership (CPTPP) and the EU Vietnam Free Trade Agreement (EVFTA), creating favorable conditions for agricultural exports.

Since 2000, Vietnam's agricultural exports have made significant progress and made significant contributions to the national economy. Vietnam continues to be committed to improving the quality and performance of agricultural products to maintain and develop its future export agriculture sector.

Restrictions on Vietnamese agricultural exports

In addition to the achievements made, there are still the following restrictions on the export of agricultural products from Vietnam:

Uneven production efficiency: In many agricultural sectors, production efficiency changes every year due to the use of traditional methods. For example, in the rice industry, yield may be affected by weather and natural disasters, making it difficult for farmers to maintain stable performance.

Quality management and food safety: Although quality management has improved, there are still risks in ensuring that all agricultural products comply with international food safety and quality standards. Food safety incidents may affect reputation and export potential.

Infrastructure restrictions: Many regions have limited infrastructure for the transportation and storage of agricultural products. In many cases, products must undergo long-distance transportation and lack modern storage facilities, leading to loss of goods and increased transportation costs.

Dependent on several major markets: Vietnam is now overly reliant on some major export markets such as the United States, China, and the European Union. These changes in market conditions may bring significant risks, especially when there are changes in trade or political regulation.

International competition: Vietnam must compete with other countries with low production costs and high efficiency. This puts pressure on improving production and marketing efficiency.

Risk management challenges: Climate change and weather may pose risk management challenges to agricultural products. The development of agricultural insurance and risk management systems is still limited, making it easier for farmers to bear the losses caused by natural disasters.

Product quality and standards: In order to continue expanding its export market, Vietnam must ensure that agricultural products meet the strict standards and requirements of the international market. This requires continuous investment and product quality supervision.

Although many achievements have been made in increasing agricultural exports, these restrictions require investment and sustained efforts to overcome to ensure the sustainability of Vietnam's agricultural sector.

5. The issue of Vietnam's agriculture export activities

In the first half of 2023, Vietnam's agricultural export sector faced many worrying challenges. The fluctuations in global commodity and energy prices may put pressure on the export prices of Vietnamese

agricultural products, thereby reducing their export value. The impact of inflation and tight monetary policy may reduce the purchasing power of export partners, leading to unpredictable fluctuations in the agricultural market. Global financial tensions and tight financial conditions may make it difficult to obtain investment, threatening Vietnam's investment and development capabilities in the agricultural industry.

In addition, lower than expected global economic growth may put pressure on Vietnam's agricultural export market as it must compete with other countries in the international market. This puts forward requirements for innovation, improving production efficiency, and enhancing the competitiveness of Vietnam's agricultural sector.

Finally, unstable weather conditions and food insecurity caused by climate change and restrictive trade policies may bring risks to the supply of agricultural products. Vietnam should promote the sustainability of agricultural production and seek to improve efficiency and ensure stable supply under difficult circumstances.

Therefore, monitoring and addressing these challenges is crucial for ensuring the development and sustainability of Vietnam's agricultural export sector in the first half of 2023.

Solutions to promote the export of Vietnamese agricultural products

Based on the economic situation and research results, we can propose some additional solutions to address the challenges of the first half of 2023 and promote Vietnam's agricultural product exports. The following are some important solutions.

Infrastructure investment: This includes the construction and upgrading of transportation, electricity, seaports, and other infrastructure projects. This helps to improve production efficiency, reduce transportation costs of goods, and create favorable conditions for Vietnamese agricultural products to be more competitive in the international market. Infrastructure investment is crucial for improving export capacity and increasing profits in the domestic agricultural sector, while promoting national economic development.

Strengthen research and development (R&D) in agriculture: R&D investment can improve production efficiency, increase the added value of agricultural products and create new and improved products. This will help Vietnam's agricultural products to be more competitive in the world market and improve their value. At the same time, it will encourage the use of high technology, such as crop planting, animal husbandry and intelligent irrigation system management, which also plays an important role in improving output and product quality.

Support farmers: In order to ensure that farmers have enough knowledge, skills and funds to effectively use advanced agricultural technologies and methods, it is necessary to provide them with training and financial support. This will help them improve productivity and product quality, and at the same time create more competitive opportunities in the international market.

Encouraging international trade: Participating in free trade agreements and expanding export markets are important components of making it easier for Vietnamese agricultural products to enter international markets and creating greater export opportunities. Close cooperation with international trading partners is a decisive factor in promoting agricultural product exports.

Strengthening natural resource management and encouraging investment: Protecting water and land resources and preventing farmland loss and disappearance are crucial for ensuring the sustainability of the agricultural sector. Meanwhile, creating favorable conditions for enterprises to invest in the agricultural sector, from production to product processing and marketing, is an important component of improving production efficiency and providing high-quality products.

These solutions will help Vietnam address current challenges and create opportunities for the future development of the agricultural export sector. Adapting attention and flexibility to the international market situation will help ensure the sustainability of Vietnam's agricultural sector.

References:

Anderson J.E. (1979), "A Theoretical Foundation for the Gravity Equation", The American Economic Review 69, pp. 106 -16.

Bergtrad J.H. (1985), "The Gravity Equation in International Trade: Some Microeconomic Fuondation and Empirial Evidence", Review of Economics and Statistic 67, pp. 474 – 481.

Bergtrad J.H.(1989), "The Generalised Gravity Equation, Monopolistic Competition and the Fator Propotion Theory in International Trade", Review of Economics and Statistic, pp.243 -153.

Deardorff A. (1998), "Determinants of Bilateral Trade: Does Gravity Work in a Classical World?", The Regionalization of the World Economy, University of Chicago Press, Chicago.

Eaton J., Kortum S. (1997), "Technology and Bilateral Trade", NBER Working Paper 6253, Cambridge.

Linneman, H. (1966), "An Econometric Study of International Trade Flows", North - Holland Publishing Co., Amsterdam.

OVERVIEW OF ORGANIC AGRICULTURAL FOOD PRODUCTION AND CONSUMPTION IN VIETNAM

Le Thi Hong Quyen* - Do Quang Giam - Le Thanh Ha****

Abstract: ***The study took an overview of the situation of organic agricultural food in terms of production and consumption in Vietnam. Along with the general trend of the world, organic agricultural production in Vietnam is one of the most favorable issues, the Government has issued many policies and regulations to create a legal corridor for organic agricultural production to develop. The number of cooperatives, farms, and businesses certified by international and Vietnamese organic agriculture standards has increased significantly. The increase in organic agricultural food consumption also represents a change in opinion about approaching consumers and improving distribution channels. However, there still exist many difficulties in selling organic agricultural food in terms of distribution channels, prices, certification and product quality control. This requires support from government agencies to develop and promote organic agricultural food in terms of production and consumption in Vietnam.***

• Keywords: *organic agriculture, organic food, organic food policy.*

JEL codes: E21

Date of receipt: 12th December, 2023
Date of receipt revision: 05th February, 2024
Date of delivery revision: 29th December, 2023
Date of approval: 05th March, 2024

1. Introduction

Summary from previous research projects on organic agricultural food (OAF) shows that it has better nutritional content, and limits toxic chemicals and disease-causing bacteria. The organic agricultural production process ensures biosecurity, environmental protection, and ecological balance (Kahl & et al., 2012; Reganold & Wachter, 2016). The use of OAF is encouraged in Vietnam by three aspects: economic benefits, environmental benefits, and ecological diversity (Nguyen Thi Thuy Dat & et al., 2021). Currently, the Government and relevant ministries are very interested in creating conditions for the development of organic agriculture, as evidenced by many policy documents issued to create favorable conditions to support and promote the production and consumption of OAF (Nguyen Van Thanh et al., 2020).

The set of organic agricultural standards was issued by the Ministry of Science and Technology (TCVN-11041), which clearly stipulates requirements for the production, processing, and labelling of agricultural organic production. This set of standards includes 13 parts: 4 parts issued in 2017 with general regulations on organic agricultural production, organic farming, organic livestock farming, assessment and certification. The 2018 specific standards for organic rice, organic tea, organic milk and shrimp were issued. In 2023, standards for organic honey, organic seaweed, organic mushrooms, organic sprouts, and organic cultivation in greenhouses and containers will be issued. In particular, Decree 109/2018/ND-CP on organic agriculture was issued, accordingly, guiding documents and planning programs were developed to create conditions for organic agricultural production for the purpose of development and promotion of OAF production and consumption in Vietnam. After 3 years of implementing Decree 109/2018/ND-CP, the number of provinces and cities producing OAF has increased significantly from 46 in 2018 to 57 in 2021. It is estimated that this number could be 62 provinces and cities by the end of 2022, these figures show the significant level of development of OAF in Vietnam (Willer & et al., 2023). Since the Government issued the National Organic Agriculture Development Program in 2020, many provinces and cities have released programs to develop and specify OAF production and consumption in localities.

Along with the government's attention to OAF, the market is increasingly developing and has marked innovations compared to previous periods. This is shown through the strong development of domestic consumption channels. Most supermarkets in large cities have reserved many separate stalls to OAF, while

** **Hung Yen University of Technical Education** (PhD candidate, Vietnam National University of Agriculture)*
*** **Vietnam National University of Agriculture; email: lethanhha89@vnua.edu.vn***

some businesses and stores only focus on OAF segment. By the end of 2021, the distribution channel has developed strongly: 17,174 OAF units, 555 processors and many OAF exporters and importers (Ministry of Agriculture and Rural Development, 2023). Therefore, in the current period, an overall assessment of the situation of OAF production and consumption is very principle for implementing and perfecting strategies and policies to support and develop OAF production and consumption.

2. Research methods

Approaching method: The author uses a practical approach to systematize issues about the production and consumption of OAF in Vietnam. A comprehensive approach to comprehensively analyze the general situation related to OAF production and consumption.

Data collection method: secondary data is collected from scientific research works on organic agriculture in Vietnam. Data on OAF production and consumption are compiled from Organic International (IFOAM) reports over the years. Data on policies of organic agricultural land used from 2015 to 2021. Categories of certified OAF get data for 2022. Promotion activities of brands, selling prices Organic agricultural foods are compiled from actual market surveys in October 2023.

Analytical methods: The study uses descriptive statistical methods and comparative methods to evaluate the situation of OAF production and consumption in Vietnam in recent years.

3. Research results

3.1. Production situation of organic agricultural products in Vietnam

The year 2012 marked the formation and strong development of the OAF market in Vietnam with the issuance of Decision No. 01/2012/QD-TTg on supporting the application of agricultural practice procedures (VietGAP), which mentioned gently to organic agricultural production. In 2015, the Ministry of Science and Technology announced the standard set of TCVN 11041:2015 Guidelines for the production, processing, labelling and marketing of organically produced foods. In 2017, the Ministry of Science and Technology issued the organic standard set of TCVN 11041:2017 to replace the standard set of TCVN 11041: 2015 (Table 1). This is the first set of standards dedicated to the production, cultivation, husbandry, processing and labelling of organic agricultural products and requirements for organizations evaluating and certifying production and processing systems of OAF. This set of standards includes TCVN 11041-1: 2017 (Part 1: General requirements for production, processing and labelling of organic agricultural products)**;** TCVN 11041-2: 2017 **(**Part 2: Organic farming); TCVN 11041-3: 2017 **(**Part 3: Organic livestock); TCVN 11041-4:2017 (Part 4: Requirements for organizations evaluating and certifying organic product production and processing systems). To have specific regulations on organic standards for some key agricultural products in Vietnam, the Ministry of Science and Technology promulgates organic standards: TCVN 11041-5:2018 (Part 5: Organic rice muscle); TCVN 11041-6:2018 (Part 6: Organic tea); TCVN 11041-7:2018 (Part 7: Organic milk); TCVN 11041-8: 2018 (Part 8: Organic shrimp).

To promote the development of organic agriculture, in 2018, the Government of Vietnam issued Decree 109/2018/ND-CP on organic agriculture, which specifically stipulates policies to encourage the development of organic agriculture production. In 2019, the Ministry of Agriculture and Rural Development issued Circular 16/2019/TT-BNNPTNT to provide detailed regulations on organic agricultural production. These are the initial premises to build the Organic Agriculture Development Project for the period 2020-2030 approved and issued with Decision 885/QD-TTg. In 2020, the Ministry of Agriculture and Rural Development issued an Action Plan to implement the Organic Agriculture Development Project for the period 2020 - 2030, which is mentioned in Decision No. 5317/QD-BNN-CBTTNS. Thanks to the implementation results of the Project, in 2022 there will be 31 Organic Organic Food Certification Agencies in Vietnam licensed to certify according to Vietnam Organic Standard TCVN: 11041, and several Vietnamese Certification agencies have been certified according to Japan-JAS Standards and European-EU Standards (Willer & et al. , 2023). By 2023, the Ministry of Science & Technology continues to promulgate organic standards: TCVN 11041-9:2023 (Part 9: Organic honey); TCVN 11041-10:2023 (Part 10: Organic seaweed); TCVN 11041-11:2023 (Part 11: Organic mushrooms); TCVN 11041-12:2023 (Part 12: Organic sprouts); TCVN 11041-13:2023 (Part 13: Organic farming in greenhouses and containers). These standards ensure that the above products are produced in an environmentally friendly manner, without the use of toxic chemicals and meet high quality standards while providing safe and healthy options. for consumers (Table 1).

Table 1: Summary of policy documents on organic agriculture development

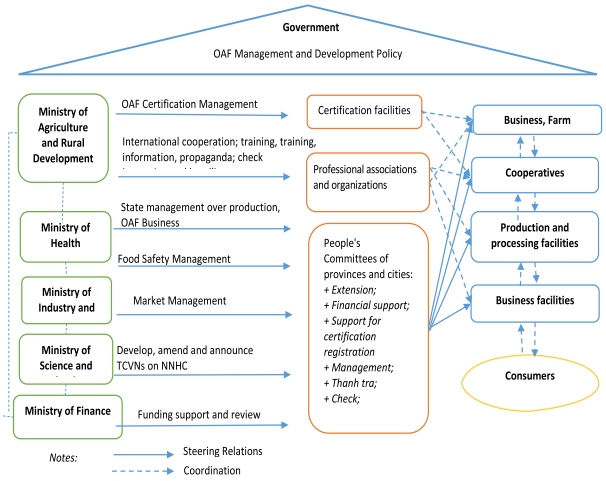
TT	Document Type	Purpose	Content
1	Decision No. 01/2012/QD-TTg	Policies to support the application of Good Agricultural Practices in agriculture, forestry and fisheries	Identify and assign tasks to Ministries and departments on activities to support the application of good agricultural practices such as financial support, training, technical application, promotion commercial advancement
2	Standard set TCVN 11041:2015	Guidelines for the production, processing, labelling and marketing of organically produced foods	Guidance on general contents related to production, processing, and production using organic methods
3	Organic standard TCVN 11041:2017 replaces the set of standards TCVN 11041:2015	This is the first set of standards dedicated to the production, cultivation, husbandry, processing and labelling of OAF and requirements for organizations evaluating and certifying production and processing systems of organic products.	General requirements for production, processing, and labeling of organic agricultural products; To have specific regulations on organic standards for some of Vietnam's key agricultural products, the Ministry of Science and Technology promulgates the following organic standards:
3.1	*TCVN 11041-2:2017 (Part 2: Organic farming)*	*Develop standards specifically for organic farming*	*Specific requirements on organic farming and animal husbandry to guide organic agriculture practices and serve as a basis for issuing organic agriculture certificates*
3.2	*TCVN 11041-4:2017 (Part 3: Organic livestock farming)*	*Develop standards specifically for organic livestock farming*	
3.3	*TCVN 11041-4:2017 (Part 4: certification organizations)*	*Develop standards and requirements for organizations evaluating and certifying organic product production and processing systems.*	*Serves as a basis for managing facilities that issue certificates of organic agriculture.*
3.4	*TCVN 11041-5:2018 (Part 5: Organic rice)*	*Develop standards specifically for organic rice production*	*Specific requirements on organic farming for each type of product to guide organic farming practices and serve as a basis for issuing organic farming certificates*
3.5	*TCVN 11041-6: 2018 (Part 6: Organic tea)*	*Develop standards specifically for organic tea production*	
3.6	*TCVN 11041-7: 2018 (Part 7: Organic milk)*	*Develop standards specifically for organic milk production*	
3.7	*TCVN 11041-8:2018 (Part 8: Organic shrimp)*	*Develop standards specifically for organic shrimp production*	
3.8	*TCVN 11041-9:2018 (Part 9: Organic honey)*	*Develop standards specifically for organic honey production*	
3.9	*TCVN 11041-10:2023 (Part 10: Organic seaweed)*	*Develop standards specifically for organic seaweed production*	
3.10	*TCVN 11041-11:2023 (Part 11: Organic mushrooms)*	*Develop standards specifically for organic mushroom production*	
3.11	*TCVN 11041-12:2023 (Part 12: Organic sprouts)*	*Develop standards specifically for the cultivation organic sprouts*	
3.12	*TCVN 11041-13:2023 (Part 13: Organic farming in greenhouses and containers)*	*Develop standards specifically for growing organic crops in greenhouses and containers*	
3.13	*Decree 109/2018/ ND-CP on NNHC*	*Specify policies to encourage the development of organic agricultural production*	*The basis for implementing policies to support, encourage and develop organic agricultural production*
4	Circular 16/2019/ TT-BNNPTNT	The Circular regulates in detail the implementation of Decree No. 109/2018/ ND-CP of the Government on organic agriculture in Vietnam regarding the following contents: (i) the Agency receiving documents and issuing registration numbers of Organizing certification of organic agricultural products ; (ii) Evaluation for issuance and supervision after issuance of Certificate of product conformity to national standards (TCVN) on organic agriculture by the Certification Organization ; (iii) Regulations on sampling and testing of OAF samples; (iv) Quality inspection, recall and handling of OAF that do not meet quality standards under the management of the Ministry of Agriculture and Rural Development	These are the initial premises to build the Organic Agriculture Development Project for the period 2020-2030 approved and issued with Decision 885/QD-TTg. Detailed regulations on:
5	The organic agriculture development project for the period 2020-2030 was approved and issued with Decision 885/ QD-TTg, dated June 23, 2020, on Approving the Organic Agriculture Development Project for the period 2020-2030	Regulating the contents of development implementation and planning for the development of organic agriculture for the period 2020-2030 to support the restructuring of the agricultural sector, create added value and ensure sustainability. The overall goal is to turn Vietnam into a leading country in organic agriculture, with specific targets for 2025 and 2030 in terms of production area, proportion of OAF, and product value. The project proposes tasks such as developing organic agricultural production areas, creating diverse forms of production organization, researching and applying technology, training human resources, developing certification and standard organizations. product standards, and encourage processing, consumption and export of OAF.	This is the basis for building an Action Plan to implement the Organic Agriculture Development Project for the period 2020 - 2030 in Decision No. 5317/QD-BNN-CBTTNS.
6	Decision No. 5317/ QD-BNN-CBTTNS dated December 28, 2020, on Promulgating the Action Plan of the Ministry of Agriculture and Rural Development to implement Decision No. 885/ QD-TTg dated June 23, 2020, of the Prime Minister approving the Organic Agriculture Development Project for the period 2020-2030	Specify tasks, and solutions and organize the implementation of tasks of the Ministry of Agriculture and Rural Development as the local agency in charge of implementing the Project; Assign presiding responsibility to units under the Ministry to carry out related tasks of the Project Enhance the effectiveness of coordination between units within the Ministry and localities in mobilizing social resources in the area to build key models to implement the Project according to the approved list and replicate effective models.	Build organic agricultural production areas Deploying diverse forms of organic agricultural production Developing human resources to participate in organic agricultural production activities Develop certification organizations, and perfect the system of standards, regulations and technical processes Develop input materials to serve the development of organic agriculture Organize inspection, supervision, evaluation and annually report to the Prime Minister on the implementation of the Project

Source: Compiled by author, 2023

According to Decree No. 109/2018/ND-CP issued by the Government on August 29th, 2018 on implementing the above OAF policies and standards, the State management system is implemented synchronously from Central to localities with the participation of the Ministry of Agriculture and Rural Development, Ministry of Industry and Trade, Ministry of Health, Ministry of Science and Technology. The Government management organization system aims to manage and provide maximum support to small businesses, cooperatives, farms, households and

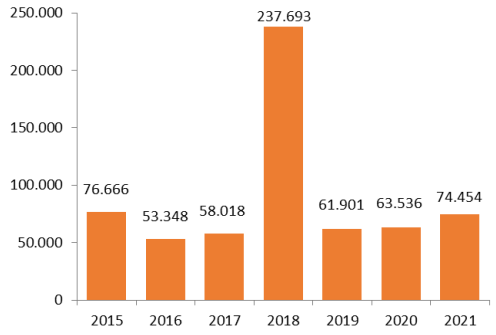
groups of households producing OAF. In addition, professional associations and organizations play an important role in propaganda, dissemination, and raising public awareness; participate in training, coaching, and supervising members who produce and trade OAF according to legal regulations (Figure 1).

Figure 1. Organizational structure of organic agricultural food management in Vietnam



Source: Compiled by author

Figure 2: Area of organic agricultural land in the period 2015-2021 (Ha)



Source: Willer et al., (2023)

The area of organic agricultural land in the period 2015-2018 has increased 3.1 times: from 76,666 hectares to 237,693 hectares (Figure 2). However, when Decree 109/2018/ND-CP was issued by the Government, many producers abandoned organic agriculture. Because the following standards of organic agricultural production are strictly required, manufacturers must comply with the processes of organic agricultural production. The area of organic agricultural land decreased sharply in 2019, then increased slightly, and by 2021 the area of organic agricultural land increased to 74,454 hectares (Willer & et al. , 2023).

The main trend of organic agricultural production today is focused on farming and animal husbandry. Organic agricultural land areas are majority used for the cultivation of rice, tea, cashew nuts, and fruit products. Organic livestock farming areas are majority used for raising pigs and chickens (Table 2).

Table 2. List of certified organic agricultural food production area/output

Product	Unit	TCVN	USDA	EU	JAS	EU, TCVN	USDA, TCVN	USDA, EU	USDA, JAS, EU	USDA, EU, JAS, TCVN	Total
Paddy	Ha	978.48	30	-	-	15	-	-	300	200	1,523.48
Shrimp rice	Ha	-	-	-	-	-	-	-	-	595.5	595.5
Tea	Ha	375.50	-	25.96		6,698.15	-	236.60	-	-	7,336.21
Coffee	Ha	-	-	-	-	-	-	-	42	-	42
Cashew	Ha	-	2,615	-	-	-	1,110.40	-	-	-	3,725.4
pepper	Ha	103.04	-	-	-	-	-	33.5	-	-	136.54
Vegetable	Ha	344.72	69	-	-	-	-	4.27	326.93	44.44	789,355
Fruit	Ha	79.26	-	-	-	-	-	4,232	9,936.83	-	14,247.89
Pig farming	No. animal	-	-	-	1,000	-	-	-	2,000	-	3,000
Dairy	No. animal	-	-	-	-	1,005	-	-	100	-	1.105
Poultry	No. animal	3,000	-	-	-	-	-	-	3,000	-	6,000
Organic shrimp	Ha	105	-	-	-	-	-	-	-	-	105

Source: Ministry of Agriculture and Rural Development (2023)

Situation of organic farming

Organic crop farming is the most diverse organic agricultural production activity in Vietnam. By 2022, Vietnam will have 33 localities that have deployed support for organic agricultural production in the field of crop farming, with a large focus on rice, vegetables, fruits, and coffee. Horticultural products are certified according to Vietnamese standards (TCVN) and foreign standards such as European standards (EU), United States standards (USDA), Japanese Standards (JAS), Canadian Standards, international organic association standards (IFOAM), Chinese standards, Korean standards (MAFRA KOREA).

Organic livestock farming

Currently, 04 localities have deployed support for organic production in the livestock sector. In particular, the main focus is on pig farming, dairy farming, and poultry farming. Livestock products have been certified according to TCVN and international standards such as EU, USDA NOP, and JAS.

Organic aquaculture

Organic aquaculture is mainly practised in the form of shrimp farming. A typical example is Ca Mau with 105 hectares of shrimp products certified organic according to TCVN.

Distribution channel

Domestic OAF consumption channels: through distribution channels such as supermarket systems Aeon, Vinmart, Saigon Co-op, through safe food store chains such as Uncle Tom, Soi Bien. Some businesses Large-scale OAF production industries such as Ecolink-Ecomart, Organic Da Lat, Vien Phu Green Farm, Vinamit, TH True Milk, Vinamilk. Besides, Vietnam is starting to run a real business model. OAF directly from farms to consumers like Dfarm. In addition, the OAF consumption market also has the presence of large, reputable brands from abroad such as Bellamy - a famous OAF brand in Australia that is officially distributed in Vietnam by the company Natural Food Group, Organica, V-organic, Orfarm and Organic Home.

Due to the strong development of e-commerce, especially after the COVID-19 pandemic, consumers' online product consumption habits have increased significantly. Social distancing restrictions due to COVID-19 and the trend of working from home have boosted e-commerce demand, indirectly supporting the expansion of OAF. Manufacturers, importers, and retail stores have opened online sales websites or through e-commerce platforms such as Shopee, Lazada, and Tiki. Products are publicly listed in terms of price and access. origin, consumers can easily choose suitable products.

Currently, supermarkets and stores selling OAF along with sell other safe food. Therefore, the keywords often found in these selling searching tools are "clean", "organic", and "safe". (Nguyễn Thị Thúy Đạt & et al. , 2021). For consumers to recognize OAF, these products are often labelled organic foods according to Vietnamese standards or some international standards. At the same time, promotion activities on the e-trading platform at these distribution channels are also very important. In large supermarkets such as Aeon, Vinmart, Co.opmart, ect. promotion activities depend on the corporation. The primary promotion goal is to attract consumers to go shopping, there is no separate communication content for OAF. Farm websites sell directly to consumers with the listed prices. OAF stores have quite variety of communication activities with a combination of traditional and modern methods (Table 3).

The selling price of OAF in Vietnam is much higher than that of conventional foods. The selling price of organic vegetables is often 3-4 times higher; Organic fruit, organic pork, organic shrimp, organic rice, organic chicken eggs can be more than 2 times higher than conventional products; Organic fresh milk is about 1.2 times more expensive than the price of conventional foods.

Table 3. Communication activities of some popular OAFbrands/stores in Vietnam

Store/ brand	Communication channels/ communication tools	Communication goals	Keywords in media content
Uncle Tom	Logos, signs, images, hotlines, stores, websites, Facebook, Youtube	Increase awareness and convince consumers; Update prices and cart; system of direct goods.	Natural; organic vegetables; safe vegetables; natural process; standard supply chain; transparent origin; offers every day; fresh and delicious every day.
Honest Sea Wolf	Logos, signs, images, hotlines, stores, websites, Facebook, Youtube	Increase awareness and convince consumers; price update; system of direct goods.	Eat well – eat clean; fresh food; Organic; clean; speciality; fresh.
Everyday Organic	Logos, signs, images, certifications, hotlines, stores, websites, Facebook	Increase awareness and convince consumers; price update.	Organic, certified organic, organic; live green; health; product groups of vegetables, fruits, meat, and eggs
Organica	Logos, signs, images, certifications, hotlines, stores, websites, Facebook	Increase awareness and convince consumers; price update; provide promotions; delivery policy	Organic; Organic; certification; culture; organic farms; understand organic; eat organic; organic living; organic mother
Huge organic vegetables	Logos, signs, images, certifications, hotlines, showrooms, websites, Facebook, Zalo	Increase awareness and convince consumers; price update; Provide a system of stores selling thousands of organic vegetables	Originates from the mind; so clean and delicious; Organic standards; Organic; organic certification
Big green	Logos, signs, images, hotlines, stores, websites, Facebook, YouTube, Tiktok	Increase awareness and convince consumers; price update; system of direct goods.	Vegetables, fruits, clean foods; Organic; knowledge.
Farmers Market	Logos, signs, images, hotlines, stores, websites, Facebook	Increase awareness and convince consumers; price update; system of direct goods.	Vegetables and fruits are safe; organic fruits and vegetables; fruit-clean Vietnamese food; promotion; safe.
Happy vega	Logos, signs, images, hotlines, stores, websites, Facebook	Increase awareness and convince consumers; price update; system of direct goods.	Your health is our joy; Organic; safe; organic food.
Clever Food	Logos, signs, images, hotlines, stores, websites, Facebook, Youtube	Increase awareness and convince consumers; price update; system of direct goods.	Clean, safe, organic; The most delicious clean food in Hanoi
Our farm	Logos, signs, images, certifications, hotlines, stores, websites, Facebook, Youtube	Increase awareness and convince consumers; price update; system of direct goods.	Organic food according to Japanese standards; Organic food; Organic.
Organic food	Logos, signs, images, hotlines, stores, websites, Facebook, Youtube	Increase awareness and convince consumers; price update; system of direct goods.	Living healthy, organic, fresh; go shopping with paper bags; Please save mother nature.

Source: Author's compilation, 2023

Table 4. Selling prices of certified organic agricultural foods compared to conventional foods

TT	Product	Unit	Organic production (1)	Conventional production (2)	Difference (1) vs. (2)	
					+/-	(%)
1	Cabbage	VND/kg	60,000	15,000	45,000	400.00
2	Dragon fruit with red flesh	VND/kg	85,000	42,000	43,000	202.38
3	Bacon	VND/kg	389,000	150,000	239,000	259.33
4	Black tiger shrimp (15 shrimp/kg)	VND/kg	700,000	350,000	350,000	200.00
5	ST 25 rice	VND/kg	80,000	31,300	48,700	255.59
6	Vinamilk 100% Organic UHT Fresh Milk - Lot of 4 Boxes 180ml	VND/lot	43,892	35,000	8,892	125.41
7	Organic chicken eggs	VND/fruit	10,800	4,000	6,800	270.00

Source: Data compiled by the author, 2023

3.2. Some difficulties in consuming organic agricultural foods in Vietnam

The organic agriculture food market is not yet developed, consumption is concentrated in modern distribution channels and serves a small market share of middle and high-end customers in urban areas. Unfair competition between certified organic food and "self-proclaimed organic " food (products without certification but listed on the packaging and labels as OAF) causes businesses to have certification. are damaged and consumers are confused. Consumers do not trust the quality of organically grown food because they cannot distinguish between the quality of organically grown food and conventional food.

Price of OAF is still high due to the strict production process and compliance with organic agricultural standards and must go through many intermediary stages when reaching consumers. Therefore, organically grown food has not attracted the attention and acceptance of domestic consumers. Market management for organically grown food has many shortcomings such as lack of funding for inspection and testing, lack of human resources, inadequate authority to inspect and handle, etc. (Ministry of Agriculture and Development Rural Development, 2022).

Table 5: Summary of difficulties in consuming organic agricultural foods in Vietnam

No	Hard	Source cited
1	Vietnamese consumers still find organic meat expensive and they cannot afford to pay more for it	(Nguyen Hoang Viet *&; et al.*, 2020; Nguyen Thao Nguyen & Le Thi Trang, 2020; Huynh Thi Kim Loan & Nguyen Ngoc Hien, 2021; Nguyen Thi Thuy Dat *&; et al.* , 2021)
2	Unavailability or difficulty in accessing organic foods	(Huynh Thi Kim Loan & Nguyen Ngoc Hien, 2021; Nguyen Thi Thuy Dat *&; et al.* , 2021)
3	Do not trust the quality level of organic food or certifications.	(Nguyen Thi Thuy Dat *&; et al.* , 2021)
4	The variety of organic foods is not as rich as conventional foods	(Nguyen Thi Thuy Dat *& et al.* , 2021)
5	Limited consumer awareness of organic food	(Ngo Minh Hai & Vu Quynh Hoa, 2016)
6	The domestic market is not clear, not many people are interested, and organic agriculture cannot be developed on a large scale.	(Le Quy Kha *et al.*, 2016)

Source: Compiled by the author (2023)

4. Conclusion

Organic agriculture plays an important role in protecting human health and the environment. The Government has issued policies and regulations on organic certification to promote OAF production and consumption. These favourable conditions have stimulated many farmers to switch from traditional agriculture to organic and be granted certificates of organic agricultural production. In addition, increased awareness of the health and environmental benefits of OAF has spurred consumer interest in Vietnam. Many consumers choose OAF to avoid chemicals in traditional agriculture, contributing to environmental and ecological benefits.

However, consuming OAF still faces many difficulties due to high prices as well as the limited consumer awareness of organic food. Consequently, a focus on effective and favorable modern distribution channels, along inadequacies related to product certification control and trust in food quality could be extremtly necessary. Organic agriculture food consumption should require close attention from all levels and sectors from central to local levels.

References:

Ministry of Agriculture and Rural Development (2023). General report: Investigating the potential of organic agriculture development and demand for organic agricultural products in Vietnam. Hanoi, Vietnam.

Huynh Thi Kim Loan & Nguyen Ngoc Hien (2021). Factors that motivate and restrain consumers' intention to buy organic food in Ho Chi Minh City. Journal of Science Technology-IUH. 50(02): 55-65.

Kahl J., Baars T., Bügel S., Busscher N., Huber M., Kusche D., Rembialkowska E., Schmid O., Seidel K. & Taupier-Letage B. (2012). Organic food quality: a framework for concept, definition and evaluation from the European perspective. Journal of the Science of Food and Agriculture. 92(14): 2760-2765.

Le Quy Kha, Nguyen Cong Thanh & Nguyen Van Hung (2016). The trend of certified organic agricultural production in the chain linking production, processing and consumption: Rice, cashew, pepper, green skin pomelo and shrimp. Ho Chi Minh City: Center for Science and Technology Information and Statistics.

Ngo Minh Hai & Vu Quynh Hoa (2016). Vietnamese perceptions of organic food: A case study in Hanoi. Vietnam Journal of Science and Agriculture 2016. 14(9): 1466-1474.

Nguyen Hoang Viet, Ninh Nguyen, Nguyen Bach Khoa & Steven Greenland (2020). Sustainable food consumption: Investigating Vietnamese consumers' intentions to buy organic meat. Sustainability 2021. 13.

Nguyen Thao Nguyen & Le Thi Trang (2020). Factors affecting consumers' intention to buy organic food in Ho Chi Minh City. Journal of Science Open University Ho Chi Minh City. 16(1): 160-172.

Nguyen Thi Thuy Dat, Nguyen Van Phat & Ho Thi Huong Lan (2021). Awareness, awareness and attitude of Hue consumers towards organic food. Hue University Journal of Science: Economics and Development. 130(5C): 189–210.

Nguyen Van Thanh, Nguyen Viet Tuan, Nguyen Thi Ai Van, Le Viet Linh, Le Van Nam, Phan Thien Phuoc & Mai Thu Giang (2020). Current situation of cooperation and association in organic rice production and consumption in Thuy Phu commune, Huong Thuy town, Thua Thien Hue. Hue University Journal of Science: Agriculture and Rural Development. 129(3A): 43–55.

Phan Thanh Hung (2019). Factors influencing Vietnamese consumers' intention to buy organic food, Jien Sy, National Economics University, 132 pages.

Reganold J. P. & Wachter J. M. (2016). Organic agriculture in the twenty-first century. Nature plants. 2(2): 15221 (2016) .

Willer H., Bernhard Schlatter & Jan T. (2023). The World of Organic Agriculture Statistics and Emerging Trends 2023. Organics International, Bonn: Research Institute of Organic Agriculture FiBL, Frick, and IFOAM.

AN EARLY WARNING SYSTEM FOR CURRENCY CRISES IN VIETNAM

MSc. Tran Ngoc Ha*

Abstract: ***This paper focus on learning about currency crises and developing an early warning model for predicting currency crises in Vietnam. Based on the exchange market pressure index (EMP) and logit/probit models, the author used series data from January 2000 to December 2019 to estimate the probability of currency crisis in Vietnam with the accuracy rate of 92.95%. The results show that six leading indicators of currency crises are real exchange rate, foreign exchange reserves, exports, current account/GDP, inflation and domestic credit.***

• Keywords: *early warning system, currency crises, logit, probit model, exchange market pressure index.*

JEL codes: F37

Date of receipt: 30th December, 2023
Date of receipt revision: 20th March, 2024
Date of delivery revision: 08th January, 2024
Date of approval: 25th March, 2024

1. Introduction

In the 1970s and the 1980s, Latin America was impacted by a sequence of currency crises: The Chilean currency crisis (1971-1974) caused the severe depreciation of CLP exchange rate; the national GDP of Uruguay plunged from 11 million USD (1981) to 5.1 million USD (1983) due to impact of the Uruguayan currency crisis (1982)[1]... In 1997, when investors lost confidence in the "Tiger economies" of Asia, currency markets in the region were hammered, especially Thailand, Indonesia, Philippines and Malaysia. In particular, the Indonesian rupiah tumbled to its weakest level in more than 86 percent against the American dollar. The currencies of Thailand, Indonesia, Philippines and Malaysia also plunged from 40 percent to 60 percent due to the Asian financial crisis. Several crises and their serious effects had led economists to focus on leading indicators of currency crisis. They tried to explain different experiences of countries with different economic structures and historical backgrounds by using different models. Unquestionably, Vietnam is no exception. Vietnam is not only being affected by external influences but also having internal problems within the economy. Therefore, the main objective of this paper is to identify leading indicators and a suitable early warning system (EWS) model of a currency crisis in Vietnam.

EWS models classify into two main classes: non-parametric (i.e. signal approach) and parametric (i.e. logit, probit). The signal approach takes its origin after publishing in 1998 the notable work of Kaminsky, Lizondo, and Reinhart. The advantages of the method are the ability to analyze a lot of variables for undertaking crise's markers. The weak point of the signals approach is a disability to check individual variables for statistical significance. According to Berg and Pattillo (1999), with the same dataset and crisis window, the parametric model can be easily calculated, with more accurate forecasting results. Consequently, this paper pursues a goal to develop logit, probit model in order to predict currency crises in Vietnam for the period 2000-2019.

2. Literature review

2.1. Overview of the international research

Over half a century, a number of theoretical and empirical studies have attempted to review, analyze and evaluate the fluctuations of macroeconomic indicators in order to design an EWS. The signal approach have been developed by Eichengreen, Rose, Wyplosz (1996); Kaminsky, Lizondo, Reinhart (1998); Hali J. Edison (2000)... is a non-parametric approach to determine the risk of currency crises.

The most important study about this approach was applied by Kaminsky, Lizondo and Reinhart - KLR in 1998. In this study, monthly data of 20 countries with 17 independent variables between the years 1975-1995 were used. The result showed that in 3/4 of the crises at least 60 percent of the indicators were giving a signal. External sector variables and the deficit provided the most accurate signals. The KLR model was quite complicated, and the accuracy rate of this model was not enough to truly predict the currency crises. Most (91%) crises were not signalled in advance, and 44% of the signals were false.

[1] *https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=UY*

** Foreign Trade University; email: tranngocha@ftu.edu.vn*

In addition, signal approach has also been studied by other researchers such as Eichengreen, Rose, Wyplosz (1996); Hali J. Edison (2000); Hemming, Kell, Schimmelpfennig (2003); Andrew Kinsman (2010)... These studies have identified the most useful leading indicators of currency crises, as well as contributing to EWS for a currency crisis. Nevertheless, the limitations of existing models were the set of variables has not comprehensively reflected the factors affecting the currency crisis as studied by Andrew Kinsman (2010); the data limitations as studied by Eichengreen, Rose, Wyplosz (1996); or the low accuracy rate because sample towards containing most of the observations that were not in the crisis period (Hali J. Edison, 2000)...

The parametric EWS is regression-based, typically logit or probit, where the crisis variable is regressed on a set of macroeconomic and financial indicators. These models were developed by JA Frankel & AK Rose (1996); M. Bussiere, M. Fratzscher (2002); Fabio Comelli (2014)...JA Frankel and AK Rose (1996) was based on a logit regression on monthly observations for 105 developing countries over the sample 1971-1992. This study found that domestic variables such as economic growth and domestic credit had the greatest predictive power of currency crises. However, the debt variables had nonlinear impacts on predicting crises. The limitation of this study was not proving the role of any mentioned variables.

Fabio Comelli (2014) had taken a research to compare how logit and probit models predict currency crises in emerging markets. These models were estimated for a panel of monthly observations for 29 developing countries, covering the period 1995-2012. The result showed that the logit and probit out-of-sample performances were broadly similar, and the growth of GDP, private credit/GDP... would increase the probability of experiencing a currency crisis. Especially, unlike previous studies, this study found that the real exchange rate were not always statistically significant.

In addition, logit and probit models have also been studied by other researchers such as M. Bussiere, M. Fratzscher (2002); Kumar, Moorthy & Perraudin (2002); Salih Barisik & Arzu Tay (2010)... These studies have contributed to EWS for currency crises, with a diverse set of variables from macroeconomic variables, spillovers to institutional variables. However, logit and probit models require a large dataset and also sufficient training examples for all the categories it needs to identify.

2.2. Overview of research in Vietnam

Since the 2008 financial crisis, Vietnamese researchers have gradually focused on EWS for predicting currency crises. In Vietnam, the signal approach has been developed by Nguyen Trong Hoai and Truong Hong Tuan (2010); Le Thi Thuy Van (2015); Vo Thi Thuy Anh (2016); Nguyen Thi My Phuong (2016)...

One of the most important studies about this approach in Vietnam was applied by Le Thi Thuy Van (2015). By measuring monthly data of 6 macroeconomic variables in Vietnam covering the period 1970-2014, the study found that from March 2013 to February 2014, there were a total of 37 warning signals. In particular, the key factors behind currency crashes were supposed to be M2 multiplier and real exchange rate with the accuracy rate from 45% to 60%. Nevertheless, the case of currency devaluation was not metioned.

In addition, signal approach has also been studied in Vietnam by other researchers such as Nguyen Trong Hoai and Truong Hong Tuan (2010); Nguyen Thi My Phuong (2016); Vo Thi Thuy Anh (2016)... These studies have identified the most useful leading indicators of currency crises and estimated the accuracy rate. However, the accuracy rate was not enough to truly judge these models.

In Vietnam, logit, probit models have been developed by Nguyen Phi Lan (2011); Nguyen Thi My Phuong (2016); Pham Thi Hoang Anh (2017)... Nguyen Phi Lan (2011) used the probit model to estimate the probability of crisis in a monthly sample of 9 independent macroeconomic variables covering the period 1996-2009. The results showed that increased foreign exchange reserves, M2/foreign exchange reserves, and GDP growth may lead to a decline in probability of experiencing a currency crisis. In particular, the key factor behind currency crashes was supposed to be M2/foreign exchange reserves.

Pham Thi Hoang Anh (2017) used series data from January 1996 to December 2016 to measure and estimate the model probability of a currency crisis in Vietnam. Based on the use of exchange market pressure index (EMP) and probit model, this empirical results suggested that probability of predicting a true currency crisis was 77.5%. In particular, external shocks and domestic credit growth were proved to be the most important indicators of a currency crisis in Viet Nam. However, this study had not completely explained the relationship between the variables.

In addition, logit and probit models have also been studied by other Vietnamese researchers such as Nguyen Ngoc Duy & Tristan Nguyen (2017); Nguyen Thi My Phuong (2016)... These studies had defined the relationship between the variables, as well as increasing the accuracy rate of models. However, the main limitation of these studies was data collection.

2.3. Literature gap

Through the relevant research, the author has found outstanding advantages as well as theories from previous experimental works as follows. (i) First, researchers make an effort to improve the set of variables in their model: Starting with macroeconomic variables (i.e. exchange rate, inflation, exports growth...), the following studies have continuosly developed new variables such as crisis contagion or institutional variation. (ii) Second, the accuracy rate of currency crisis prediction becomes higher and higher.

However, the previous studies had limitations that should be addressed as follows. (i) First, these models have not completely explained the signal, as well as the the relationship between the variables. (ii) Sencond, data collection was one of the main limitations. (iii) Third, the sample towards containing most of the observations that were not in the crisis period.

In an attempt to overcome the limitations of these studies, this paper contributes to the logit, probit models in novel ways as follows. (i) First, the author makes a comparison of theories and models of predicting currency crises in order to provide a summary table of advantages and disadvantages found in each model. (ii) Second, this study increases data frequency in the model by collecting monthly data of 7 macroeconomic variables in Vietnam covering the period 2000-2019.

3. Research models

3.1. Exchange market pressure index (EMP)

Inheriting from Eichengreen, Rose & Wysplosz (1996) the author build the formula for calculating exchange market rate (EMP) including nominal exchange rate (NER), real interest rate (r) and foreign exchange reverses (RES). Where is the change in indicator i between the moment t and moment (t-1), and is the standard deviation of indicator i (i is regarded as alternatives for the three indicators).

$$EMP = \frac{1}{\delta_{NER}} * \Delta NER + \frac{1}{\delta_{r_l}} * \Delta r_l - \frac{1}{\delta_{RES}} * \Delta RES$$

To determine the appropriate β coefficient for EWS in Vietnam, I calculated the EMP index on a monthly basis, from the period January 2001 - December 2019, a total of 228 observations with different β coefficients from 0.5 to 3. In practice, Vietnam has experienced two episodes of soft economy, including: (i) The first episode from August 2008 to December 2009 and (ii) the second episode from October 2010 to October 10. 2011.

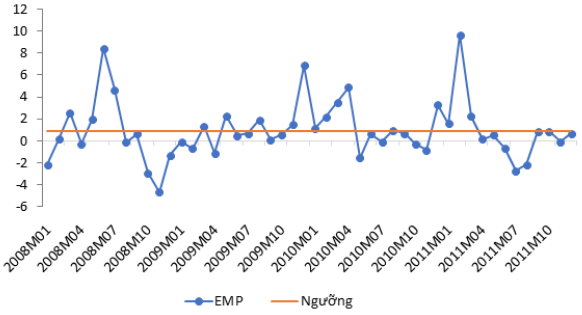
In summary, during the research period in Vietnam, the crisis signals are issued as value of either 1 (there is a crisis) or 0 (no crisis) as follows:

$$CC \begin{cases} = 1 \text{ if EMP} > \mu\text{EMP} + 0.5\delta\text{EMP} \\ = 0 \text{ otherwise} \end{cases}$$

Window length is the period after the EMP index surpasses the threshold and sends out a crisis signal, there will be a possibility that the currency crisis occurs within this period. According to Commeli (2013), the window length is 12-24 months; Berg, Borensztein & Pattillo (2005) is 24 months; and according to Salih Barisik & Arzu Tay (2010) is 12 months. Additionally, within the the window length, the later detected observations that are too close to the first observation in the window range are automatically discarded.

A reasonable crisis window length should predict the probability of the currency crisis occurring during the window period and large enough to exclude overlapping signals. Based on the EMP index's result, I select the window length of 18 months. With β = 0.5 in the research period, when the signal is continuously emitted with high frequency, the signals in the period of 18 months before and after the first crisis signal all signal the impending the crisis in practice, and this time interval is large enough to rule out overlapping signals.

Figure 1. EMP Index



Source: Author's calculation

Based on the calculation results of the EMP index built above, the author found that the Exchange market pressure index reflected the crisis situation precisely when it emitted signals that coincided with two volatility periods. In stable time, the EMP indicator shows very little signal or exceeds the threshold, or there are only small, discrete, discontinuous signals. The results of EMP have a quite accurately reflection of the crisis situation in Vietnam, however, there are still some flaws that exist. Firstly, the EMP index indicates the occurrence of currency attacks, but not all currency attacks turn out to be a currency crisis. Secondly, there are still lags in the signal which cross the signaling threshold and crisis. Despite its limitations, the EMP is still considered as a reliable indicator by the virtue of it directly reflects the pressure of foreign currencies has on the local currency. Moreover, the EMP results

are also suitable for Vietnam's situation of currency crisis.

3.2. Empirical specification

3.2.1. Data and variables selection

Dependent variables

With the window length of 18 months, the model determines the dependent variable as probability of a currency crisis (Yt) converted from CC_t. Yt is a binary variable that has only two value of 1 and 0.

Yt = 1 if there is a currency crisis or $CC_t = 1$

Yt = 0 if no crisis or $CC_t = 0$

Independent variables

Independent variables are selected from most - used macroeconomic variables in previous references (appendix), including: Real exchange rate, foreign exchange reserves, current account/GDP, export and domestic credit. Besides, the model uses two new indicators that rarely applied but appropriate to Vietnam: Money supply M2 and inflation. All the indicators are collected on a monthly basis, defined as the percentage change at month t against the previous month (t-1), apart from current account/GDP is interpolated from quarterly data.

Table 1. Model variables and source

Indicators	Code	Source	Frequency	Transformation
Probability of a currency crisis	Y	Author's calculation	Monthly	
Real exchange rate	ER	IMF	Monthly	%
Foreign exchange reserves	RES	IMF	Monthly	%
Export	EX	IMF	Monthly	%
Current account/GDP	CAGDP	CEIC	Monthly	%
Inflation	RIRD	IMF	Monthly	%
Domestic credit	INF	CEIC	Monthly	%
M2	M2	CEIC	Monthly	%

Source: Author's calculation

3.2.2. Model hypotheses

The forecasting model is built up for the purpose of testing the following hypotheses:

H1: Real exchange rate has positive impact on probability of a currency crisis

The real exchange rate (RER) reflects the competitiveness of domestic currency against foreign currency taking into account the changes in inflation rate between nations. As RER increases, the purchasing power of domestic currency decrease, causing a relative rise in foreign currency value. According to Kaminsky & Reinhart (1996), a currency crisis occurs when the local currency depreciates sharply, therefore, RER increases, leading to a higher possibility of crisis.

H2: Foreign exchange reserves has negative impact on probability of a currency crisis

One of the important roles of foreign exchange reserves is to meet the demand for financial payment and to keep a proactive, flexible monetary policy. The growth in foreign exchange reserves is believed that the government and the central bank have more room to stabilize exchange rates and ensure payment activities, thereby reducing the possibility of soft economy due to currency depreciation.

H3: Domestic credit has negative effect on explained variable

Domestic credit refers to the safety level of domestic financial institutions, exclusively the commercial banking system. Domestic credit is granted by banks to a wide range of customers for many different purposes through loans, trade credits, debt securities or other receivables, thereby promoting the production process, commercial trade, domestic consumption are fundamental issues to accelerate economic growth and diminish the likelihood of currency crises.

H4: Current account/GDP has a positive effect on explained variable

Current account/GDP is an effective sign of a country's competitiveness in the international market. It is argued that the current account deficit and trade deficit have deliberate influence on the economy. Others, however, cling to that deficit could be an indicative of economic expansion due to the gain in the number of FDI inflows into domestic market. Similarity, a surplus can be an alarm for an on-going chaos of economy. At that time, an increase in the ratio Current account/GDP will provoke the possibility of currency crisis.

H5: The inflation rate has an unclear effect on the dependent variable

The inflation rate directly interprets the purchasing power of the local currency in particular episode, thus, increasing inflation reduces the purchasing power of the domestic currency. However, in periods of need for growth, inflation has effective influence on promoting economic expansion. The rate of inflation has different positive and negative effects on the probability of the currency crisis, depending on government's purposes.

H6: Monetary supply M2 has a positive effect on the dependent variable

Monetary supply M2 is an important indicator showing the amount of money in economic circulation. M2 includes M1 money, demand deposits and time deposits at commercial banks. As the money supply M2 grows continuously and exceeds the country's

real output level, the imbalance between the money supply growth rate and GDP growth rate will generate the continuous decrease in domestic currency value, leading the possibility of currency crisis.

H7: Export has a negative effect on the dependent variable

Export is defined as the sale of goods and services to foreign markets, so it reflects the country's production performance. Growing exports promises that the country's production capacity is going up and developing stably, reducing the likelihood of a crisis.

4. Empirical results

4.1. Descriptive statistics and correlation matrix

Descriptive statistics results are illustrated in the following table:

Table 2. Descriptive statistics

No	Indicator	Code	Obs	Mean	Std. Dev.	Min	Max
1	Real exchange rate	ER	227	0.0029	0.00	-0.0587	0.0732
2	Foreign exchange rate	RES	227	0.1467	0.0477	-0.1082	0.0732
3	Export	EX	227	0.2346	0.1523	-0.3764	0.6452
4	Current account/GDP	CAGDP	227	0.1664	0.0186	-0.0097	0.0894
5	Inflation	INF	227	0.0055	0.0077	-0.0080	0.0391
6	Domestic credit	DC	227	0.1585	0.0191	-0.0562	0.0877
7	M2	M2	227	0.2255	0.0963	0	0.5050

Source: Author's calculation, Stata

The table shows that correlation among dependent variable and most independent ones in a weak or very weak level, in which foreign exchange reserves have the strongest correlation level.

Table 3. Correlation matrix

	Y	ER	RES	EX	CAGDP	INF	DC	M2
Y	1							
ER	0.3238	1						
RES	-0.4205	-0.0789	1					
EX	0.2826	0.0035	-0.0026	1				
CAGDP	0.2250	0.1017	0.0217	0.0698	1			
INF	-0.0003	0.0700	0.0232	-0.1376	0.7602	1		
DC	-0.1590	-0.2552	-0.0134	0.0726	-0.0602	-0.0839	1	
M2	0.0844	-0.1054	-0.0489	0.0304	0.3723	0.3513	0.3528	1

Source: Author's calculation, Stata

4.2. Empirical results

4.2.1. Logit and probit regression

Both logit and probit method give similar results and findings with the statistical characteristics of models are unfavorable. The resultant logit regression indicates the value of R-squared as 64.61%, which means seven independent variables used in the model have explained 64.61% of the variation of dependent variable. Real exchange rate, foreign exchange reserves, export, current account/ GDP are the most significant predictors of currency crises at 1% level of significance. The other variable is money supply M2, at 5% level of significance.

Result of probit regression demonstrates a higher, but not much powerful, value of R-squared as 64.94%. Basically, Real exchange rate, foreign exchange reserves, export, current account/ GDP still remain highly significant indicators for forecasting future crises. The considerably obvious discrepancy lies in money supply M2 with a significant level of 10%. The results are clearly presented in the following table.

Table 4. Estimation of Logit and Probit model

Model	Logit model			Probit model		
Indicator	Coef	Std.dev	p-value	Coef	Std.dev	p-value
Real exchange rate	327.157	86.846	0.000	182.445	48.902	0.000
Foreign exchange reserves	-66.220	11.587	0.000	-37.538	6.234	0.000
Export	10.204	2.462	0.000	5.834	1.347	0.000
Current account/GDP	155.170	31.509	0.000	88.234	17.242	0.000
Inflation	-352.022	81.892	0.000	-198.465	43.934	0.000
Domestic credit	-51.022	19.488	0.009	-29.378	10.993	0.008
M2	7.753	3.778	0.04	4.142	2.118	0.051
Constants	-5.096	1.071	0.000	-2.195	0.550	0.000
R2	**0.6461**			**0.6493**		
Obs	**227**			**227**		

Source: Author's calculation, Stata

4.2.2. Crisis probability

The table contains the matrix of crisis probability of both models. The matrix shows that that the percentage of correct observation is quite high at 92.95%, consisting of either signal issued for predicting currency crises or no signal in the background of economic stability. The models predict the probability of signaled crises at a high level of accuracy, 36 out of 46 observations, or 78.36%. Specially, if there are no crises and no signals issued, the model will correctly predict 175/181 observations, or 96.68%.

Table 5. Crisis Probability

	Crisis-hit period	Non-crisis-hit period	Total
Signal	36	10	46
No signal	6	175	181
Total	42	185	227
Probability of true observations		(185+36)/227 = 92.95%	
Probability of predicting a true currency crisis		36/46 = 78.26%	
Probability currency crisis without signals		6/181 = 3.31%	
Probability of wrong signal over total signals		10/46 = 21.74%	
Probability of not occurring crises and no signals		175/181 = 96.68%	

Source: Author's calculation, Stata

4.2.3. Goodness of Fit test

To figure out how well the sample data fit a normal distribution case in the actual population instead of the observed values, the author employ Hosmer - Lemeshow test to examine Goodness of Fit of models. The analysis indicates p-value > 0.05 in both logit and

probit model, thus, either logit or probit regression is suitable and applicable methods for practice in Vietnam.

Table 6. Test for Goodness of Fit

	Logit model	Probit model
Observation	227	227
Group	10	10
Hosmer-Lemeshow chi2(8)	5.66	4.86
p-value	0.6857	0.7722

Source: Author's calculation, Stata

4.3. Testing of Assumptions

To ensure that the model estimates are point and unbiased estimators, the model is tested for three assumptions: multicollinearity, heteroskedasticity, autocorrelation.

4.3.1. Testing for Multicollinearity

Multilinearity refers to a situation in which two or more explanatory variables are highly linearly related. A popular measure of this presence is Collins test, using the variance inflation factor (VIF). Analysis the magnitude of multicollinearity from the size of VIF indicates that each explanatory variable has VIF < 10, then the variable is not collinear with the remaining explanatory variables.

Table 7. Collins test for Multicollinearity

Explanatory variable	VIF
ER	1.09
RES	1.01
CAGDP	2.66
INF	2.66
DC	1.28
M2	1.43
EX	1.05
Medium	1.60

Source: Author's calculation, Stata

4.3.2. Testing for Heteroskedasticity

The author examine the presence of heteroskedasticity by the Breusch-Pagan test.

Table 8. Breusch-Pagan test for heteroskedasticity

chi2(1)	18.79
Prob > chi2	0.4623

Source: Author's calculation, Stata

Since the Prob > chi2 = 0.4623 is higher than the chosen 0.05 significant level, the residuals are not heteroskedastic.

4.3.3. Testing for Autocorrelation

It should be stressed that autocorrelated errors is usually present in time-series data. I practice the Durbin-Watson test for determine the autocorrelation errors. Since the Prob > chi2 = 0.7117 is higher than the chosen 0.05 significant level, the residuals are not serial correlated.

Table 9. Durbin-Watson test for autocorrelated errors

lags(p)	chi2	df	Prob > chi2
5	2.924	5	0.7117

Source: Author's calculation, Stata

5. Results and discussions

5.1. Positive indicators

Real exchange rate - the standard of a local currency value against a foreign currency, has a significance level of 1%, showing the propriety for anticipating forthcoming currency crisis in Vietnam. As the exchange rate accelerates, domestic currency depreciation forces the forex market more vulnerable to currency attacks. During the study periods, in case economy kept developing and balanced, the exchange rate steadily increased over the years thanks to government regulations. Nevertheless, in the 2008-2009 and 2010-2011 crises, the exchange rate skyrocketed, demonstrating an expeditious depreciation of Vietnam dongs against foreign currency.

Current account/GDP is also a key indicator for crisis prediction in Vietnam at 1% level of significance, positively alter the probability of currency crises. In fact, the impact of fluctuation in this variable is dissimilar between pre-crisis period and in mainly crisis period. In particularly, there is a large deficit in the pre-crisis 2007, then reduction or even surplus when the crisis broke out (2008-2009). The same phenomenon was detected for the period 2010-2011. Therefore, the fact that the large deficit in Vietnam current account is often a forewarning signal of a currency crisis.

Export has a positive effect on the dependent variable, which coincides with the conclusion of Nguyen Phi Lan (2011); Nguyen Ngoc Duy & Tristan Nguyen (2017). Vietnam's exports are focused mainly on low-value raw materials, so in terms of added value, the contribution to economic growth is much smaller than nominal export sales. Therefore, in practice, this increased export volume has not yet brought about the possibility of growth in national income.

The M2 money supply has the results and finding as Andre Kinsman (2010) and Salih Barisik & Arzu Tay (2010). For a constant level of output, the stable increase in the money supply causes a disturbance in the supply and demand of money market, leading to the contraction in the purchasing power of domestic currency. In addition, if the money supply is continuously pumped and form "bubbles" in the market, the national monetary system will be disturbed. This phenomenon

along with the depreciation of the local currency easily leads to the possibility of a currency crisis.

5.2. Negative indicators

Domestic credit has a negative relationship with model dependent variable. An advance in domestic credit suggests an economic growth as residents and businesses take advantage of loans. In practice, during the period 2008-2011 of economic slowdown, Vietnam's domestic credit slightly decreased by virtue of pessimistic on economy. However, if the domestic credit overdevelops, it can lead to a bank crisis arise from bad debts, which results to a currency crisis.

Foreign exchange reserves are considered as a necessary macroeconomic indicator for Vietnam with significance level of 1%. As a shock absorber for the money market and stabilizing the exchange rate, the decline in foreign exchange reserves represents that the Government's ability to intervene in the forex market is weakened. When this reduction is deep enough, the goal of ensuring the value of the local currency will not be exercised. It can be seen that, in Vietnam, in the period 2008-2011, foreign exchange reserves decreased rapidly.

Inflation is negatively correlated with the dependent variable, which consisting with the conclusions of Eichengreen, Rose & Wyplosz (1996). For a developing country like Vietnam, a reasonable acceleration in inflation will be the driving force for economic growth. Specifically, apart from the crisis period of 2008-2011, Vietnam always kept the inflation rate below 10%. For developing countries, a local currency with strong intrinsic value will not be vulnerable to various currency attacks.

5.3. Model evaluation

The independent variables used in the models are chiefly significant at the 1% level, except for M2 with a lower level. The results of regression do not occur randomly but have practical significance, showing through testing for goodness of fit. The proposed model also has covered a large scope of study from January 2001 to December 2019 with the model probability up to 92.95%, evaluating most of the recent currency attacks in Vietnam. In addition, the model data are completely extracted from reliable secondary data sources such as IMF or ADB.

Firstly, with the R2 in both models just surpassing 64%, collection of independent variables is unable to cover all the important macroeconomic indicators in Vietnam. *Secondly,* there is a restriction specified in many preceding papers that ours have not overcome: The independent variables in the model are purely related to macroeconomy yet not to take into consideration the influence of institutional variables - measures of implying government performance to difficulties. Finally, the data set has not been thoroughly updated until the end of 2020, while 2020 is a year of countless fluctuations for Vietnam's socio-economy due to the breakthrough of Covid-19, lacking an important research phase.

6. Conclusions

In this research, after studying preceding domestic and international research, I have worked on building a theoretical system of currency crisis and three generations in the early warning system. In terms of currency crisis predicting model, the logit & probit model has the application of EMP index; it is also verified by a dataset of Vietnamese macroeconomic indicators collected in the period between January 2000 and December 2019. The final results demonstrate the high ability of precise anticipation for currency crisis, particularly pointing out significantly unstable period in Vietnamese economy from 2008 to 2011.

However, due to restricted access to data resources, our research remains some drawbacks: (i) Firstly, R-squared value in the constructed model is not considered a high rate; (ii) Secondly, in the regression model, non-economic factors have not been mentioned in terms of the possibility in triggering currency crisis. Therefore, the suggested orientation for further study is constructing an advanced model with additional governance-relating indicators and up-to-date data collection.

References:

Võ Thị Thúy Anh, Trần Nguyễn Trâm Anh & Hà Xuân Thủy (2016). Mô hình cảnh báo sớm khủng hoảng tiền tệ: Nghiên cứu thực nghiệm tại Việt Nam. Journal of Asian Business and Economic Studies, Vol. 27.

Barisik, S., Tay, A. (2010). An Analysis of Financial Crisis by Early Warning Systems Approach: The Case of Transition Economies and Emerging Markets (1994-2006 Period Panel Logit Model). International Journal of Economic Perspectives, Volume 4, Issue 2, 403-426.

Berg, A., Pattillo, C. (1999b). Predicting Currency Crises: The indicators approach and an alternative. Journal of International Money and Finance, Vol. 18, No. 4, pp. 561 - 86

Bussiere, M., Fratzscher, M. (2002). Towards a new early warning system of financial crises. Working Paper No.145, European Central Bank.

Comelli, F. (2014). Comparing Parametric and Non-parametric Early Warning Systems for Currency Crises in Emerging Market Economies. Review of International Economics, Volume 22, Issue 4.

Eichengreen, B., Rose, A. and Wyplosz, C. (1996). Contagious Currency Crises. CEPR Discussion Paper No. 1453

Frankel, Jeffrey A., Andrew K. Rose (1996). Currency crashes in emerging markets: an empirical treatment. International Finance Discussion Papers No. 534, Board of Governors of Federal Reserve System .

Hemming,R., Schimmelpfennig, A., Kell, M.(2003). Fiscal Vulnerability and Financial Crises in Emerging Market Economies. Occasional paper, International Monetary Fund, ISBN 9781589061965.

Jeffrey, S., Tornell, A., Velasco, A. (1996). Financial Crises in Emerging Markets: The Lessons From 1995. Brookings Papers on Economic Activity, No. 1, pp. 147-215.

Kaminsky,G., Lizondo,S., Reinhart, C. (1998). Leading Indicators of Currency Crisis. IMF Staff Papers Vol. 45, No.1. International Monetary Fund.

Nguyễn Thị Mỹ Phượng (2016). Cảnh báo sớm khủng hoảng tiền tệ tại Việt Nam: Cách tiếp cận LOGIT/PROBIT. Tạp chí Ngân hàng, Số 09.

MEASURING AND ANALYZING FACTORS INFLUENCING EFFICIENCY OF PUBLIC HIGHER EDUCATION INSTITUTIONS IN VIETNAM

MA. Ninh Thi Hoang Lan*

Abstract: ***This study aims to measure the efficiency and analyze the factors affecting efficiency of public higher education institutions in Vietnam. The author use a two-stage method, with data collected from public higher education institutions in Vietnam for the periods of 2019-2020 to 2021-2022. In the first stage, the Data Envelopment Analysis was applied to measure the efficiency of public higher educaiton institutions in Vietnam. In the second stage, the Tobit regression model was used to assess the factors affecting the efficiency scores of higher education institutions. The results show that the proportion of public funding in total revenue of higher education institutions, the student-to-teacher ratio, the admission score, the proportion of professors and associate professors have an impact on the efficiency of public higher education institutions in Vietnam. From there, the study makes some recommendations to improve the efficiency of higher education institutions in Vietnam.***

• Keywords: *public higher education institutions, data envelpment analysis (DEA), efficiency.*

Date of receipt: 26th January, 2024
Date of delivery revision: 29th January, 2024
Date of receipt revision: 29th February, 2024
Date of approval: 25th March, 2024

1. Introduction

Higher education (HE) plays an increasingly important role in the development of countries. HE supports economic growth by (1) training a skilled and adaptable workforce, (2) generating new knowledge through basic and applied research, and (3) promoting innovation through the application of knowledge and technology created and applied (Salmi, 2017). In the early stages, when the number of students participating in HE was still small, countries often provided full subsidies for HE. However, with the development of secondary education, the number of high school graduates increased significantly in countries, coupled with the awareness of both individuals and society about the role of high-quality human capital, so the demand for HE continued to increase, causing the number of students to increase rapidly. As the number of students continue to expand, public funding is becoming increasingly diluted. In light of this, governments in many countries have on the one hand looked for other sources of funding for HE, on the other hand tried to increase the efficiency of government use of resources for HE.

Research on measuring the efficiencies of higher education institutions (HEIs) is crucial. Evaluating the performance of public entities is a key factor for allocating scarce public resources. Identifying inefficient entities, with issues in allocation of public resources, may be the start of any attempt to improve the development of the public sector.

The objective of this study is to measure the efficiency of public HEIs in Vietnam, analyze the factors influencing the efficiency, and propose some recommendations to improve the efficiency of HEIs in Vietnam.

The paper is set out as follows. Next section illustrates the relevant literature review. The estimation methodology and data sources are discussed in Section 3. Section 4 discusses the empirical findings. Some conclusions and recommendations are made in Section 5.

2. Literature review

The microeconomic theory of production looks at the activity of an organization mainly as a production process that transforms inputs (such as capital and labor) into outputs (products). Efficiency consists in optimal combination of inputs

*** Thuongmai University; email: ninhhoanglan@tmu.edu.vn***

and methods required for the production process, as to yield the maximum amount of output as possible. Measuring the efficiency of universities is highly important because, given a fixed quality level, maximizing the output of teaching and research is a major objective of HEIs, especially under resource constraints.

Developed by Charnes et al. (1978), DEA uses linear programming techniques and data on the inputs and outputs of decision-making units (DMUs) to calculate a production possibility frontier (Johnes, 2006, p. 274). The efficiency of each DMU is then measured, with scores ranging from 0 to 1, with 1 representing the most efficient unit on the frontier. DEA can be approached from an input-oriented or output-oriented. While the original DEA model assumed constant returns to scale, a subsequent model developed by Banker et al. (1984) introduced the concept of variable returns to scale.

DEA is well-regarded as a suitable technique for measuring efficiency in education. It offers several advantages, such as the ability to handle multiple inputs and outputs and the requirement for only information about quatity, not prices. Furthermore, its non-parametric nature helps avoid misspecification problems (Johnes, 2006; Kosor, 2013).

With the traditional DEA model, a popular extension is the two-step process, which is used to analyze the factors affecting the efficiency of DMUs. The first stage involves calculating the efficiency scores using the traditional DEA model. The second stage then builds a regression model to analyze how environmental variables affect efficiency of the DMUs. This two-step process provides an evidence-based platform for devising action plans to improve the efficiency of HEIs.

In Vietnam, several studies have employed the DEA to measure the efficiency of HEIs. Huyen N. T. T et al. (2015) measured the technical efficiency of 30 Vietnamese doctoral-granting HEIs using DEA for the academic year 2012-2013. The efficiency scores of all HEIs were relatively low, averaging around 0.5. Vu T. T. et al. (2022) utilized DEA to evaluate the economic efficiency of 172 HEIs in Vietnam during the period from 2012 to 2016. Tran and Villano (2021) applied advanced dynamic network DEA to assess the operational efficiency of 82 public HEIs in Vietnam during the period 2011-2013. After computing the efficiency scores of the HEIs, segmented regression analysis was proposed in the second stage to investigate the impact of contextual factors on HEI efficiency. Additionally, Oanh N. H. (2023) utilized data from the academic year 2019-2020 from 29 institutions under the management of the Ministry of Education and Training. However, the majority of recent studies only measure the efficiency of institutions, with very few conducting in-depth analyses of the factors influencing institutional efficiency.

3. Research methodology

3.1. Selection of research methods and variables

DEA was applied in the first stage to measure the efficiency of higher education institutions. A Tobit regression model was applied for the second stage.

Currently, there is no standard to guide the selection of variables used to measure university efficiency (Katharaki & Katharakis, 2010). Usually, input data are classified as human, physical and capital. Output data refer to lecturing and research activities. According to studies using the DEA method worldwide and in Vietnam, considering data availability, the author chooses the following input and output variables.

There are four input variables, including:

(1) Total full-time equivalent (FTE) academic staffs

(2) Floor area per FTE student

(3) Public funding allocated to each institution

(4) Revenue from tuition of each institution

The ouputs consist of three variables:

(1) Total FTE enrolment

(2) Number of graduateds

(3) Employment rate of graduates after one year

In the DEA method, both input-oriented and output-oriented models can be used. However, similar to the view of Tran and Villano (2021), the input-oriented efficiency measure is chosen to encourage HEIs to save input resources in the context of existing outputs. This is because in Vietnam, the expansion of enrollment quotas is limited by regulations to ensure the quality of education.

In order to carry out the present study, the variable returns to scale model (BCC) was considered, as it envisages the oscillation of public funding and size differences in the evaluation process of public HEIs (Charnes et al, 1978).

After using the DEA method to calculate the efficiency of HEIs, in the second stage, the author uses a regression model to assess the factors affecting the efficiency of HEIs. The regression model is as follows:

$$DEA_i = \alpha + \sum_k \beta_k X_{ki} + \varepsilon_i$$

Where:

- DEA_i is score efficiency of HEI i, obtained through the DEA model, calculated in the previous stage of the research.

- Xi represents the matrix of factors that influence the efficiency of HEI i.

- k is the number of factors affecting efficiency in the model.

- ε_i a random term.

The author uses the Tobit regression model, which estimates relationships between variables when the dependent variable is censored on either side. Right-censoring assigns a threshold value to cases equal to or above it, and left-censoring does the same for values below. Given that the efficiency score from the DEA model ranges from 0 to 1, the Tobit model is an appropriate choice.

According to Kagatani (2022), the factors determining the efficiency of HEIs are classified into four groups: (1) HEIs' autonomy, (2) students' intellectual and socioeconomic background, (3) funding mechanism, and (4) organizational characteristics. Therefore, based on the ability to collect data, the author included the following environmental variables in the model:

- Dummy variable representing autonomous and non-autonomous HEIs, representing the HEIs' autonomy. Of 242 HEIs in 2022, 23 public HEIs were granted full financial autonomy based on Resolution No. 77/NQ-CP. It is expected that autonomous HEIs will be more effective than non-autonomous HEIs.

- Admission scores of HEIs, represent the academic ability of students. The hypothesis is that HEIs with higher admission scores will be more effective.

- State management agency: According to current regulations, authors are classified HEIs into 4 groups: HEIs managed directly by the Government, by the Ministry of Education and Training, by other central ministries and agencies, and by the People's Committees of provinces.

- Share of public funding in HEIs' total revenue.

- Student-to-teacher ratio.

- Ratio of professors and associate professors to total academic staffs.

3.2. Data source

As of 2022, Vietnam has 237 HEIs, including 172 public institutions and 65 non-public ones. The study is based on data collected from "three publicly reported issues" published on the websites of HEIs in the period from 2019-2020 to 2021-2022.

According to present regulations, HEIs are required to to publicly disclose on their quality commitments, quality assurance conditions, financial revenues and expenditures and other relevant information on their websites. However, as some HEIs had incomplete or lacking content in their reports, the results are based on only 283 observations. Furthermore, due to the lack of comprehensive data on the research outcomes of HEIs in these reports, the author will focus only on outputs related to teaching.

For the second stage, variables lsvcq_gvch, ldiemdauvao, lcovieclam were featured in natural logarithms, in order to homogenize data throughout the analyzed period.

4. Empirical findings

4.1. The estimation results from the DEA model

Overall, the results showed that the average efficiency score of HEIs was quite high (above 0.9). However, there was a large dispersion in the efficiency scores of the HEIs, and this dispersion increased over time. It is noteworthy that the average efficiency of public HEIs is tending to decrease. This is also reflected in the decreasing number of efficient HEIs (efficiency score of 1) over the years. In 2020, there were 34 HEIs with an efficiency score of 1, in 2021 there were only 31 units, and in 2022 this number was 29 (see Table 1).

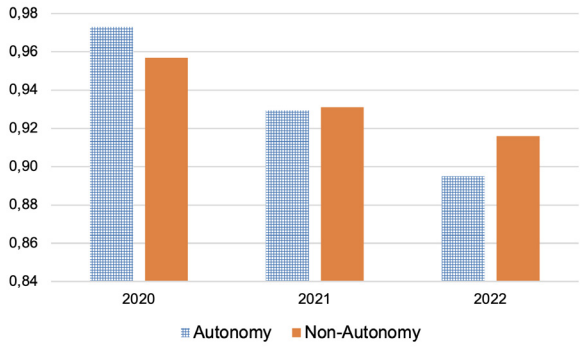
Table 1: Efficiency estimates from the DEA model

	2020	2021	2022
Mean	0.9579	0.9310	0.9149
Standard deviation	0.0460	0.0672	0.0846
Max	1	1	1
Min	0.8353	0.7143	0.7040
Efficient units	34	31	29

Source: Compiled by the author

The dynamics of HEIs' efficiency exhibited a noteworthy transformation from 2020 to 2022. Initially, autonomous HEIs exhibited superior efficiency scores in comparison to their non-autonomous counterparts. Nevertheless, this advantage was short-lived, as their scores experienced a significant decline by 2022, even falling below the average of non-autonomous HEIs. This result contradicts the earlier findings of Vu et al. (2023), who documented a notably higher efficiency among autonomous schools during the period spanning from 2012 to 2016. While our study (2020-2022) initially suggested a promising outlook for autonomous HEIs, it ultimately uncovered a disquieting trend: all HEIs experienced declining efficiency, with autonomous HEIs suffering a steeper drop.

Figure 1: Efficiency of public HEIs in 2020-2022: Non-autonomy and autonomy

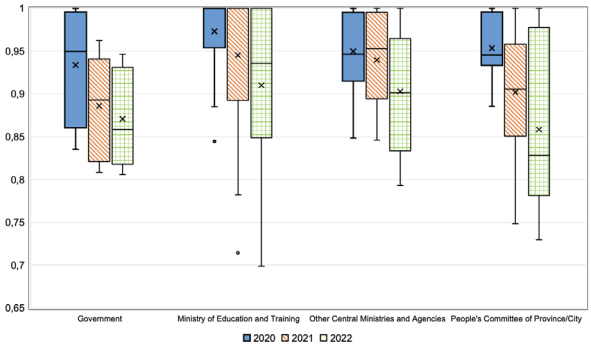


Source: Compiled by the author

Statistical data reveals a significant reduction in public funding for autonomous HEIs since 2021. While the proportion of public funding in their total revenue remained around 40% in 2020, it experienced a sharp decline to 3.36% in 2021 and further decreased to 1.98% in 2022. This precipitous decline coincided with the COVID-19 pandemic, a period of economic hardship for households. In response, the government implemented a tuition freeze for public educational institutions from 2021 to 2023 to alleviate the financial burden on those severely impacted by the pandemic. This financial limitation challenged HEIs' infrastructure investment and staff income, potentially causing the observed efficiency decrease, especially in autonomous HEIs.

When examining by the management agency, it is somewhat surprising that, the average efficiency scores of HEIs under direct government management were the lowest (the lowest in all three years of the study). HEIs under the Ministry of Education and Training, which demonstrated the highest efficiency, followed by those managed by other Ministries and Central Agencies, and then HEIs under the management of People's Committees of Provice following (see Figure 2).

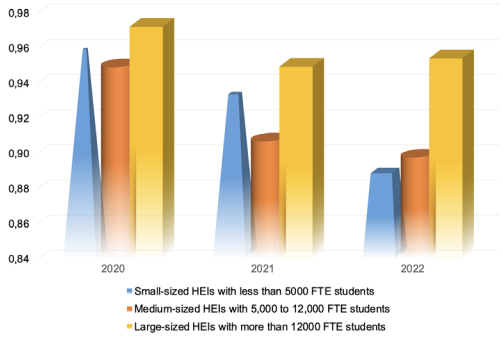
Figure 2: Efficiency of public HEIs in 2020-2022 classified by state management agency



Source: Compiled by the author

In terms of HEI size, it can be observed that, on average, large public HEIs exhibit higher efficiency scores, and these scores remain relatively stable over the three-year study period. Conversely, small and medium-sized HEIs have lower efficiency scores, and a marked decline in efficiency is observed over the three-year study period. Notably, HEIs with a small-sized of less than 5,000 students experience the most significant decrease in efficiency.

Figure 3: Efficiency of public HEIs in 2020-2022 classified by HEI size



Source: Compiled by the author

4.2. Factors influencing the efficiency of higher education institutions in Vietnam

Table 2: The estimated results from the Tobit regression model

```
Observations: (24 observations deleted due to missingness)
         Total  Left-censored     Uncensored Right-censored
           283              0            189              94

Coefficients:
             Estimate Std. Error z value Pr(>|z|)
(Intercept) -0.55374    0.20384  -2.717 0.006595 **
r_nsnn       0.13984    0.03262   4.286 1.82e-05 ***
lsvcq_gvch   0.05361    0.01079   4.970 6.71e-07 ***
lcovl        0.22437    0.04500   4.986 6.16e-07 ***
r_gs        -0.10001    0.05309  -1.884 0.059612 .
ldiemdauvao  0.10736    0.03200   3.355 0.000793 ***
tuchu       -0.01356    0.02561  -0.529 0.596573
CP          -0.04798    0.02234  -2.148 0.031713 *
BGD          0.03237    0.01246   2.598 0.009384 **
UBND        -0.01352    0.01561  -0.866 0.386623
Log(scale)  -2.53568    0.05502 -46.089  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Source: Compiled by the author

The results of the Tobit regression model show that:

Public funding positively impacts HEIs' efficiency. Specifically, a 1% increase in public funding boosts HEIs' efficiency score by 0.1398 points, emphasizing public funding's ongoing positive effect. This finding underscores the continued positive impact of public funding on HEI efficiency. However, recent trends paint a concerning picture. The proportion of public funding allocated to HEIs has been declining, coinciding with stricter government regulations on tuition fee increases during the study period. These financial constraints have posed significant challenges for all HEIs, resulting in a decline in their overall efficiency.

The statistically significant positive coefficient of the student-to-teacher ratio contradicts initial expectations. The estimated coefficient indicates that a 1% increase in this ratio corresponds to a 0.05-point increase in efficiency. This result suggests that institutions experience enhanced efficiency when the growth rate of student enrollment outpaces that of faculty recruitment. This trend may stem from institutional efforts to meet enrollment targets by augmenting faculty numbers during the study period. However, the relative inexperience of these new hires, compared to existing academic staffs, might contribute to the observed positive association between the student-to-teacher ratio and efficiency.

Another variable exhibiting unexpected results is the proportion of professors and associate professors among the total faculty members of institutions. The model shows a 1% rise in professors and associate professors ratio leads to a 0.1 point decrease in a HEI's efficiency score. This might be due to their higher salaries and research focus, while this study prioritizes teaching efficiency. This supports Hammes Junior et al.'s findings (2020) but contrasts with Salas-Velasco's (2020). In the context of Vietnam, this phenomenon can be explained as follows. It is possible that the salaries paid to associate professors and professors are relatively higher compared to other faculty members, leading to higher costs. However, associate professors and especially professors in Vietnam are more engaged in research activities, whereas this study focuses on efficiency in teaching.

The employment rate of students one year after graduation increases, and the admission score exhibits a positive coefficient as expected, with statistical significance at the 0.1% level, with values of 0.22 and 0.11, respectively, which are quite high. This phenomenon can be explained by the fact that as these indicators increase, they reflect an improvement in the quality of education provided by the institution, thus allowing the institution to attract better-qualified students and consequently achieve higher efficiency.

When analyzed by state management agency, institutions under the Ministry of Education and Training exhibit an average efficiency score higher by 0.3 points compared to other institutions (with all other factors being equal). Institutions under government management have the lowest average score, followed by those managed by People's Committees of Province. The results of the regression model indicate that autonomous and non-autonomous HEIs do not exhibit statistically significant differences possibly due to the short study period and small sample size, leading to this result.

5. Conclusions and Recommendations

5.1. Conclusions

Average efficiency scores of public HEIs in Vietnam have shown a decreasing trend over the three years of the study.

When analyzed by state management agency, universities directly under the Government had the lowest technical efficiency, followed by universities managed by People's Committees of Province and other Ministries and Central Agencies, and the highest scores were achieved by HEIs under the Ministry of Education and Training.

Divided into the groups of autonomous and non-autonomous HEIs, both groups showed a decreasing trend in efficiency scores over time. In 2020, autonomous HEIs had higher efficiency scores than non-autonomous HEIs. By 2021, the average efficiency scores of the two groups were equal, and by 2022, the efficiency scores of autonomous HEIs were lower than those of non-autonomous HEIs.

Regarding the factors affecting the internal efficiency of HEIs, public funding in HEIs has a positive impact on efficiency. This should be considered in the context of the Government's policy of gradually reducing public funding for public HEIs. An increase in the admission scores and the employment rate of graduates one year after graduation will lead to higher efficiency for the HEI. However, it is quite surprising to find that if the growth rate of FTE students increases faster than the growth rate of the number of FTE academic staffs, the efficiency of HEIs will increase, and if the proportion of Associate Professors and Professors increases, the efficiency of HEIs will decrease. This could be because the rapid increase in the number of Associate Professors and Professors has not yet helped HEIs to improve their efficiency.

5.2. Recommendations

Based on the research findings, recommendations are suggested as follows:

Firstly, there is a need to increase the level of public funding for HEIs in a rational manner. The estimation results indicate a declining trend in the efficiency scores of HEIs, with one of the key reasons being the decreasing allocation of public funding to these institutions. In fact, the level of public funding for HEIs in Vietnam is currently extremely low. According to the World Bank (2020), Vietnam allocates only approximately 0.33% of its GDP to public investment in HE, which is significantly lower compared to other countries. Meanwhile, revenue from research activities and other sources accounts for a negligible proportion, forcing HEIs to heavily rely on tuition fees for financial resources. This situation results in both inadequate and unsustainable financial resources for the institutions, posing a significant obstacle to the development of the higher education system in Vietnam.

Secondly, institutions need to focus on enhancing the quality of education and facilitating employment opportunities for students. The research emphasizes the relationship between student quality and the efficiency of institutions. To enhance efficiency, institutions need to attract high-quality students (reflected in increased admission scores), while also increasing job prospects for graduates. Improving the quality of education may involve various aspects such as enhancing curriculum relevance to societal needs, strengthening practical training, equipping students with soft skills, and establishing close cooperative relationships with businesses.

Thirdly, institutions also need to develop a prudent and effective human resource strategy. The study reveals an unexpected relationship between the student-to-teacher ratio, between the ratio of professors and associate professors to total academic staffs and efficiency. The rapid increase in the number of academic staffs and the proportion of professors and associate professors in institutions does not seem to achieve the expected efficiency. As mentioned earlier, this discrepancy may be because the study focuses solely on teaching efficiency rather than research efficiency. However, HEIs should also consider maintaining a reasonable student-to-teacher ratio, focus on improving the quality of existing faculty through training, research, and knowledge sharing, and implement policies to attract and retain talented individuals to enhance the quality of their workforce.

References:

Banker, R. D., Charnes, A., & Cooper, W. W. (1984), Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis, Management Science, 30(9), 1078–1092.

Charnes, A., Cooper, W. W., & Rhodes, E. (1978), Measuring the efficiency of decision making units, European Journal of Operational Research, 2(6), 429–444.

Hammes Junior, D. D., Flach, L., & Mattos, L. K. D. (2020), The efficiency of public expenditure on Higher Education: a study with Brazilian Federal Universities, Ensaio: Avaliação e Políticas Públicas Em Educação, 28(109), 1076–1097.

Huyen, N. T. T., Thenet, G., & Minh, N. K. (2015), Applying DEA sensitivity analysis to efficiency measurement of Vietnamese universities, Management Science Letters, 983–992.

Johnes, J. (2006), Data envelopment analysis and its application to the measurement of efficiency in higher education, Economics of Education Review, 25(3), 273–288.

Kagatani, K. (2022), Data Envelopment analysis of higher education public expenditure efficiency: A systematic review, Master of Arts in Public Policy, Central European University, Vienna, Austria.

Katharaki, M., & Katharakis, G. (2010), A comparative assessment of Greek universities' efficiency using quantitative analysis, International Journal of Educational Research, 49(4), 115–128.

Kosor, M. M. (2013), Efficiency Measurement in Higher Education: Concepts, Methods and Perspective, Procedia - Social and Behavioral Sciences, 106, 1031–1038.

Oanh N. H. (2023), The application of the performance-based budget allocation mechanism to the higher education system in Vietnam, Vietnam Journal of Educational Sciences, 19(1), 1–13.

Salas-Velasco, M. (2020), The technical efficiency performance of the higher education systems based on data envelopment analysis with an illustration for the Spanish case, Educational Research for Policy and Practice, 19(2), 159–180.

Salmi, J. (2017), The Tertiary Education Imperative: Knowledge, Skills and Values for Development, SensePublishers, Rotterdam.

Tran, C. D. T. T., & Villano, R. A. (2021), Financial efficiency of tertiary education institutions: A second-stage dynamic network data envelopment analysis method, The Singapore Economic Review, 66(5), 1421–1442.

Vu, T. T., Thao, P. P., Huong, N. M., Thanh, D. L., & Hiep, P. H. (2023), Economic efficiency of higher education institutions in Vietnam between 2012 and 2016: a DEA analysis, Journal of Applied Research in Higher Education, 15(1), 199–212.

FINTECH DEVELOPMENT IN VIETNAM: OPPORTUNITIES AND CHALLENGES

PhD. Nguyen Van Thong*

Abstract: ***In the context of globalization, the surge of Financial Technology (Fintech) has created a new wave in the financial sector. Fintech is developing rapidly in Vietnam, however, there are still many challenges that need to be addressed to ensure the sustainable development of this field. The article reflects the current state of Fintech development in Vietnam, analyzes the opportunities and challenges for Fintech development. At the same time, the article synthesizes the experience of Fintech development in some countries in the world and draws lessons for Vietnam. The article also proposes some solutions to promote Fintech development in Vietnam in the coming time.***

• Keywords: *fintech, opportunities, challenges, Vietnam.*

Date of receipt: 26th December, 2023

Date of delivery revision: 03rd January, 2024

Date of receipt revision: 29th February, 2024

Date of approval: 25th March, 2024

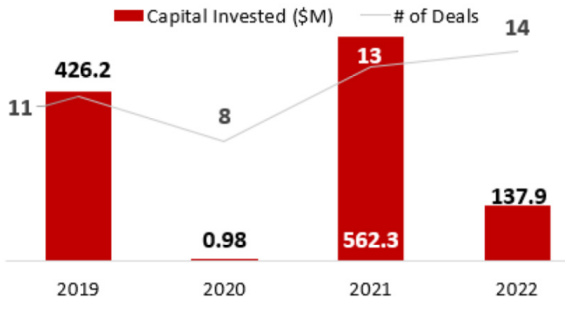
1. The current state of fintech in Vietnam

Fintech, short for Financial Technology, is a rapidly growing field in the digital age. It encompasses applications, services, and business models that use technology to improve or replace traditional financial activities. Fintech offers numerous advantages for consumers and businesses, including cost savings, enhanced customer experience, expanded access to financial services, and the creation of innovative solutions. However, it also raises fundamental concerns regarding security, privacy, risk management, legal frameworks, and ethics.

The Fintech sector in Vietnam has undergone substantial expansion in recent years, marked by advancements in product and service diversity, enhanced quality, and increased investment capital. Although Fintech initially emerged in the country in 2017, it wasn't until the years 2020 and 2021 that a noteworthy surge in both the quantity and quality of startups within this domain was observed. According to data from the State Bank of Vietnam and the Vietnam Fintech Market Report 2021, the count of Fintech companies quadrupled from 39 at the end of 2015 to surpass 154 by the conclusion of 2021, with around 70% of them classified as startups. Remarkably, 2021 marked a significant milestone for Vietnam's Fintech market as the Internet economy achieved a valuation of 21 billion USD, securing the 14th position in Asia and the 70th globally (Nextrans, 2023).

The number of Fintech users in Vietnam has shown a significant increase over the years. Specifically, in 2019, the number of Fintech users reached approximately 42 million people. This number has steadily increased each year due to the growing expansion of the Fintech market. By 2022, the number of Fintech users had reached nearly 69 million people (Statista, 2023).

Figure 1. Fintech deal count & deal value (USD billion) 2019 - 2022

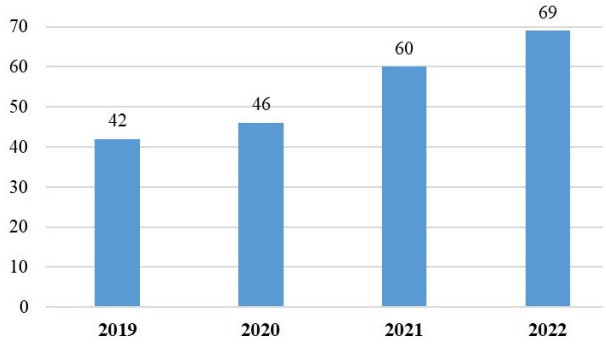


Source: Nextrans, 2023

The Fintech sector in Vietnam, as outlined in the Vietnam Fintech Market Report 2022 by Nextrans, underscores significant expansion in the number of Fintech startups. Out of the 260-plus companies that were active in the Fintech sector by the conclusion of 2022, 81 were specifically focused on payment services, constituting 31.1% of the total Fintech companies. Additionally, 42 companies were dedicated to peer-to-peer lending (P2P Lending), accounting for 14.7%, while 31 companies were operating in the Blockchain/ Crypto (cryptocurrency) segment, making up 11.9% of the total Fintech landscape (Nextrans, 2023).

** Thai Nguyen University of Economics and Business Administration; email: nguyenvanthong@tueba.edu.vn*

Figure 2. Number of customers using Fintech products in the period 2019-2022 (Million people)

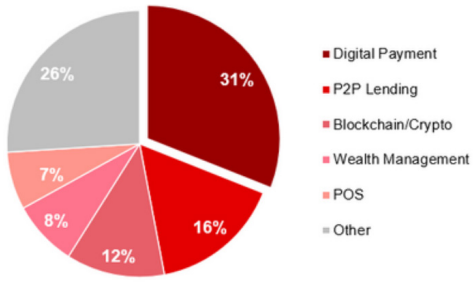


Source: Statista, 2023

Experiencing remarkable expansion, the Fintech sector in Vietnam, particularly since 2021, has seen a surge in growth driven by heightened demand for digital financial services amidst the pandemic. As of 2022, the number of Fintech startups operating in Vietnam has surpassed 260, a significant leap from the 144 recorded in 2018. These startups are categorized into five primary segments: Digital payment, Lending, WealthTech, InsurTech, and Blockchain/Crypto.

Despite being in its early stages, Vietnam's Fintech industry has garnered substantial attention and active support from the Government, the Prime Minister, and relevant ministries and agencies. Various programs and initiatives have been deployed to diversify financial products, establish robust business models, enhance electronic payment systems, fortify Fintech infrastructure, and nurture startup ecosystems. The overarching aim is to construct a supportive legal framework that fosters Fintech growth in Vietnam.

Figure 3. The number of startups in the Fintech sector in 2022



Source: Statista, 2023

The State Bank of Vietnam, in collaboration with the Government, has spearheaded programs like Mobile Money, establishing direct communication channels with Fintech companies to provide support and address operational challenges. The Regulatory Sandbox Mechanism for Fintech activities within the banking sector has been improved, and proposals have been presented to the Prime Minister to further enhance the Fintech ecosystem.

Aligning with the development strategy for Vietnam's banking sector until 2025, with a vision toward 2030, emphasis is placed on fostering collaboration between banks and Fintech companies, creating a competitive environment, and establishing standards for linking financial institutions with Fintech entities. To fortify the legal framework and stimulate financial services market growth, the Minister of Finance issued Decision No. 446/QD-BTC in 2018, outlining an Action Plan for Implementing Industry 4.0 Technology in Finance and Budget.

Additionally, the government has introduced specialized tax programs and incentives for startups and enterprises in the information technology sector, including those in Fintech, under Resolution No. 41/NQ-CP (2016). As Vietnam's Fintech sector evolves rapidly, it presents substantial potential for socio-economic development. To sustain and enhance its regional and global standing, Vietnamese Fintech must persist in innovating, improving service quality, adhering to legal regulations, and fostering close collaboration with stakeholders.

2. Opportunities and challenges for the development of fintech in Vietnam

2.1. Opportunities

Fintech represents a field with significant potential and development opportunities in Vietnam. Firstly, the increasing demand among Vietnamese users for convenient, secure, efficient, and transparent financial services is a driving force. Fintech can meet these needs by leveraging emerging technologies such as mobile, cloud, artificial intelligence, and block chain. Vietnam boasts a substantial market for Fintech, with a population of 100.3 million, including 62.2% in the working-age category (General Statistics Office, 2023). The country's future digital economy is expected to benefit from a new generation of young talent well-versed in modern technologies, enabling Vietnam to stay abreast of global trends. Consequently, Vietnam has the potential to capture new trends and become a favored nation in the international market. The demand for Fintech participation from people in rural, mountainous, and remote areas is on the rise. Previously, residents in these regions faced challenges accessing the internet and modern technology

applications. However, this landscape is undergoing significant changes, and these areas will have increased access to the financial technology market in the future (Pham Thi Linh, 2023).

Secondly, the Vietnamese Government has implemented policies and incentives to support Fintech development. In 2017, the State Bank of Vietnam established the Financial Technology Department to manage and regulate Fintech activities. Additionally, the government has allowed certain Fintech companies to participate in sandbox programs to test and enhance their products and services. Moreover, the government has issued Decree 80/2021/ND-CP on business operations and provision of financial technology services. This decree has created a clear and favorable legal framework for the development of Fintech in Vietnam.

Thirdly, stakeholders in the Vietnamese Fintech sector, including Fintech companies, traditional financial institutions, investors, regulatory authorities, non-governmental organizations, universities, etc., have engaged in various forms of collaboration to create a favorable environment for Fintech development. Fintech companies and traditional financial institutions have signed numerous strategic cooperation agreements to leverage each other's strengths. Investors have injected significant capital into Fintech businesses in Vietnam. Regulatory authorities and non-governmental organizations have organized events, workshops, training, and consulting for Fintech enterprises. Universities have introduced numerous courses and programs related to Fintech to cultivate a skilled workforce for the industry.

2.2. Challenges

Fintech is one of the rapidly developing sectors with immense potential in Vietnam. However, Fintech also faces numerous challenges that demand innovation and adaptability from businesses and regulatory authorities. One of the most significant challenges is the shortage of high-quality human resources in the Fintech field. This results in intense competition and increased human resource costs for Fintech enterprises.

Another challenge is the lack of legalization and transparency for Fintech activities. Currently, Vietnam lacks a clear and comprehensive legal framework for various Fintech services, such as electronic payments, online lending, crowdfunding, robo-advisors… This poses difficulties for Fintech businesses in operations, market expansion, and introduces risks for consumers and national security. In addition, the management, inspection, and supervision by competent authorities over the cooperative relationships between banks and non-banking entities in this field are not sufficiently stringent and have not proven to be truly effective. This significantly impacts the development of the Fintech ecosystem (Dinh Bao Ngoc & Tran Nguyen Hong Van, 2023).

Furthermore, there is a challenge of competition with both international and domestic counterparts. With technological advancements and globalization, Vietnamese Fintech enterprises not only contend with large and reputable international Fintech companies but also compete with traditional banks and domestic technology companies entering the Fintech sector. To survive and thrive in this fiercely competitive environment, Vietnamese Fintech enterprises need to focus on improving the quality of products and services, leveraging the advantages of the domestic market, and creating differentiation and added value for customers.

3. Fintech development experiences in some countries

3.1. Experience of Japan

The Japanese government has been actively engaged in developing a legal framework and adjusting regulations to foster the growth of Fintech. In 2016, Fintech was identified as a promising growth sector within Japan's "2016 Japan Revitalization Strategy." To incentivize banks to establish IT-related subsidiaries for Fintech advancement, swift amendments were made to certain regulations, such as the "Bank Act," in May 2016. Concurrently, the Japanese government restructured its policy management system by introducing the "Regulatory Sandbox" framework, aimed at facilitating growth and innovation in the Fintech sector.

Additionally, Japan has established an enabling environment for Fintech companies. The Ministry of Economy, Trade, and Industry (METI) initiated a program offering a 5% discount on credit card, debit card, prepaid IC card, or smartphone purchases at registered retail stores and small to medium-sized restaurants from October 2019 to June 2020. Recognizing the potential for foreign financial service companies, the Financial Services Agency (FSA) and the Tokyo Metropolitan Government (TMG) have formed dedicated teams to attract and support those considering expansion into Japan.

Furthermore, the Japanese government has implemented measures to support currency circulation, including the digitization of personal identification, research and testing of personal information cards, integration of electronic personal information identification into smartphones, and the implementation of a data management system to digitize government administrative processes (Shoji Masayori, 2020).

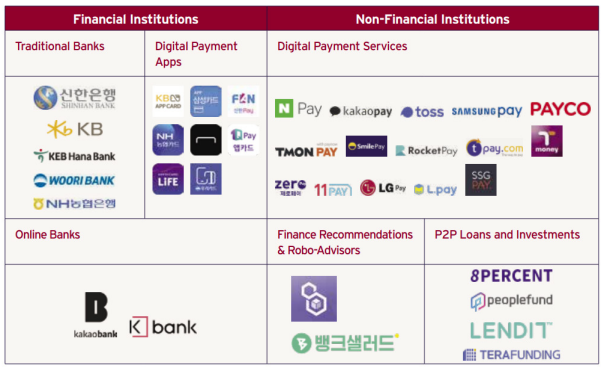
3.2. Experience of South Korea

South Korea stands at the forefront of ICT infrastructure development, concurrently driving advancements in digital financial technology within the financial sector. The country has witnessed a rapid transformation through substantial investments in cutting-edge technologies, particularly in the realm of Fintech. This evolution has resulted in the expansion and diversification of the financial landscape, with Fintech playing a role in both replacing and complementing existing financial institutions and traditional market functions.

As per estimates from South Korea's National IT Industry Promotion Agency, there has been a significant upsurge in the adoption of electronic payment services. Specifically, the user base of payment gateways (PG) increased twelvefold from 2008 to 2020. The contribution of electronic payment services to the GDP rose from less than 2% in 2008 to over 25% in 2020. Initially dominating the market with nearly 70% in 2017, payment gateways saw a decrease to 53% in 2020. The key driver behind this substantial growth was the rapid evolution of convenient payment methods facilitated by payment gateways since 2008. The foundational element for this transformation was the Information Technology (IT) infrastructure, which laid the groundwork for digitizing the entire payment and money transfer process within the goods and services market, a development that commenced in the early 2000s. The digital transformation, coupled with the advent of smartphones, paved the way for faster, more accessible, and more precise financial transactions. This was achieved through the expansion of payment gateways, the promotion of prepaid card usage, and the encouragement of mobile payment services (Intralink Research, 2020).

The journey of digital development, initiated in the early 2000s, has seen the dominance of financial companies owned by major technology corporations (BigTechs) and select large financial technology firms in the South Korean Fintech industry. Electronic payment service providers within the Fintech sector are mandated to register with the Financial Services Commission (FSC) and adhere to the regulations outlined in the Electronic Financial Transaction Act (EFTA). Initially, when the EFTA was enacted in 2007, only 21 companies had registered. However, this number has experienced significant growth, reaching 157 by the conclusion of 2020. The surge in registration is not limited to major players; numerous smaller companies have emerged, founded by businesses in manufacturing, retail, and distribution. Their primary goal is to offer convenient payment services to customers through shopping platforms or distribution networks. To operate, these providers of convenient payment services must undergo registration with the Financial Supervisory Service (FSS) (Youngwon Nam & Sunwoo T. Lee, 2023).

Figure 4. Korea's fintech ecosystem



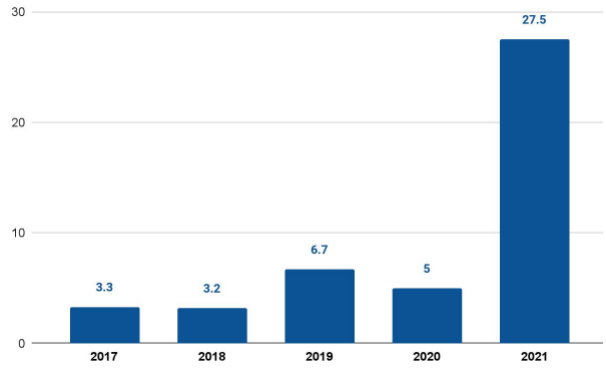
Source: Intralink Research

3.3. Experience of the UK

The United Kingdom, positioned as the second-largest hub for Fintech investments globally, trails behind the United States. Despite its leading role in Europe's Fintech landscape, the sector witnessed a substantial decline in investments in 2022, plummeting by nearly 56% from 39 billion USD to 17.4 billion USD, attributed to elevated interest rates and persistent inflation. The overall count of M&A, PE, and VC deals in the Fintech sector also experienced a downturn, recording only 593 transactions in 2022. In the initial half of 2023, Fintech investments in the UK dropped to 5.9 billion USD. Comprising over 1,600 companies, the UK's Fintech sector is projected to double in size by 2030. Currently contributing an estimated 13.4 billion USD (£11 billion) to the UK economy, the sector sustains

over 76,000 jobs. In May 2019, the U.S. Treasury and the UK's Treasury jointly established the U.S.-UK Financial Innovation Partnership (FIP) to foster collaboration within the private sector, facilitate the exchange of regulatory expertise, and drive growth and innovation. The FIP operates through two primary pillars: regulatory and commercial. As the largest Fintech ecosystem in Europe, the UK, while navigating its future relationship with the European Union, has prioritized the Fintech sector. In February 2021, the UK's Treasury released the Kalifa Review, led by Ron Kalifa, OBE, which presented various recommendations. These include alterations to UK listing regulations, improvements to tech visas, the establishment of a regulatory 'scalebox,' and the creation of a Center for Finance, Innovation, and Technology. The UK government has already implemented some of these recommendations, including amendments to the UK's listing rules (Deep Knowledge Analytics, 2022).

Figure 5. Fintech in the UK Investments in 2017 - 2021 (£ billion)



Source: Deep Knowledge Analytics, 2022

In order to position itself for success in the Fintech sector, the UK government has consistently prioritized technology investments. Through substantial investments in cutting-edge technology, coupled with a robust appetite for innovative products and a leading legal framework, the UK has carved out a distinctive position, fostering favorable conditions for both SMEs and financial institutions to operate within this domain. The UK has been a trailblazer in supporting new regulations in financial services. In 2015, the country introduced its inaugural Fintech Sandbox, providing a platform for the development of innovative products and services while adhering to specific regulations. Subsequently, the "Fintech Sector Strategy" was unveiled in 2018, presenting policies and initiatives designed to assist Fintech businesses in overcoming short-term and long-term challenges. The demand for innovation has played a pivotal role in driving Fintech service development in the UK. As of December 2020, approximately 12 million people in the UK had opened accounts with digital-only banks, with nearly two-thirds of the population using contactless cards. Moreover, 83% of UK SMEs embraced mobile banking. Capitalizing on this opportunity, UK banks swiftly adapted. An illustrative example is Santander, which implemented nCino's cloud solution to enhance efficiency, expedite the loan approval process, and elevate services for both SMEs and customers. This strategic move enabled the bank to reduce the time required to make lending decisions by approximately 40% (Deep Knowledge Analytics, 2022).

4. Lessons learned for fintech development in Vietnam

Firstly, by examining the experiences of various countries globally, Vietnam can derive several crucial lessons for the development of its Fintech sector. One notable lesson is the importance of establishing a regulatory framework that is both flexible and transparent. Successful Fintech markets often feature adaptive regulatory mechanisms, as exemplified by Singapore's implementation of a "sandbox" model, allowing firms to test new products with reduced legal requirements.

Secondly, promoting collaboration among stakeholders within the Fintech ecosystem is a key aspect of success. Advanced financial infrastructure that facilitates secure connections between Fintech businesses, banks, investors, customers, and third parties characterizes thriving Fintech markets. China, for instance, has effectively employed a widespread electronic payment system, demonstrating the benefits of such collaborative efforts.

Thirdly, fostering innovation and enhancing Fintech capabilities is imperative. Successful Fintech sectors typically operate within competitive business environments that encourage innovation. Israel, boasting over 500 Fintech firms, stands out as an example where supportive measures, including access to venture capital, startup incubators, and training programs, have contributed to their success.

Fourthly, Vietnam should focus on enhancing its regulatory mechanisms to be adaptive, transparent, and

harmonized. Tailoring regulatory frameworks to specific Fintech services and products and creating a centralized regulatory authority are crucial steps. Engaging relevant stakeholders in the development and enforcement of regulations, especially Fintech businesses and industry associations, should be a priority.

Fifthly, strengthening collaboration among stakeholders within the Fintech ecosystem is essential. Vietnam should create favorable conditions for connections between Fintech companies and various stakeholders, fostering an environment of cooperation. The development of a national electronic payment platform and increased international cooperation in Fintech can further enhance the ecosystem.

Sixthly, encouraging innovation and boosting Fintech capabilities should be a strategic focus. Vietnam can achieve this by fostering a business environment that minimizes legal and administrative barriers and offers tax incentives. Support for Fintech businesses in accessing venture capital, startup incubators, and training programs is paramount. Additionally, increasing user awareness and skills related to Fintech will play a crucial role in building trust and promoting adoption.

5. Some solutions to promote the development of fintech in Vietnam

In order to foster sustainable and effective development in Fintech, Vietnam needs to leverage opportunities and proactively address challenges. Several fundamental solutions can be implemented to promote Fintech development in Vietnam:

Firstly**,** there should be a focus on training and attracting highly skilled personnel for the Fintech sector. This is a crucial factor in creating innovative Fintech products and services that meet customer and market demands. Vietnam should enhance collaboration between universities, research institutes, businesses, and regulatory authorities to establish high-quality training programs that stay updated with the latest technological trends. Additionally, Vietnam should attract experienced international experts in Fintech to transfer knowledge and skills to the domestic workforce.

Secondly**,** there is a need to improve technology infrastructure to support Fintech business operations. Technology infrastructure includes elements such as network bandwidth, information security, electronic payment systems, big data, and artificial intelligence. Vietnam should invest in the development and upgrading of this infrastructure to ensure that Fintech businesses can operate efficiently, securely, and flexibly. Moreover, encouraging collaboration between Fintech companies and banks, investors, customers, and third parties is essential. Vietnam should also develop a national electronic payment platform, allowing Fintech firms to provide convenient and secure payment services to users. Additionally, international cooperation in Fintech should be enhanced to exchange experiences, learn, and apply the latest technologies.

Thirdly**,** Vietnam needs to continue refining legal and managerial frameworks for the Fintech sector. Legal and managerial frameworks are crucial factors in creating a favorable business environment for Fintech companies, protecting customer and user rights, and preventing potential risks. Vietnam should establish clear, transparent, and unified legal regulations for various Fintech activities, aligning with international and regional standards. Furthermore, encouraging the participation of relevant stakeholders, particularly Fintech businesses and industry associations, in the development and enforcement of Fintech regulations is recommended.

In conclusion, in order to advance Fintech development in Vietnam, close coordination among stakeholders such as the government, businesses, banks, traditional financial institutions, universities, research institutes, and the user community is crucial. Only through such collaboration can Fintech maximize its potential, contribute to economic growth, and enhance the quality of life for the people of Vietnam.

References:

Deep Knowledge Analytics (2022). Fintech in the UK Industry Overview Q2 2022 Teaser. Available at https://analytics.dkv.global/Fintech-in-the-uk-q2-2022/teaser.pdf.

Dinh Bao Ngoc, Tran Nguyen Hong Van (2023). The current situation and solutions for the development of financial technology in Vietnam. Banking Review.

Intralink Research (2022). "Fintech South Korea Market Intelligence Report". Available at https://www.intralinkgroup.com/Syndication/media/Syndication/Reports/Korean-Fintech-report-Oct-2020.pdf.

General Statistics Office (2023). Press release on the population, employment, and labor situation in the fourth quarter and the year 2023.

Nextrans (2023). Vietnam Startup Industry Report 2022, Nextrans. Available at https://www.nextrans.vn/resources.

Pham Thi Linh (2023). Prospects of the Financial Technology Market in Vietnam. Review of finance.

Shoji Masayori (2020). The Latest in Fintech in Japan. Policy Research Institute, Ministry of Finance, Japan, Public Policy Review, Vol.16, No.4, October 2020.

Statista (2023). Fintech in Vietnam - statistics & facts.

Youngwon Nam, Sunwoo T. Lee (2023). Behind the growth of Fintech in South Korea: Digital divide in the use of digital financial services. Telematics and Informatics.

THE APPLICATION OF DATA MINING MODEL TO PREDICT ECONOMIC FLUCTUATIONS

Hoang Thu Hien* - Tran Vu Nhat Ha - PhD. Nguyen Binh Minh*** - Phạm Minh Hoàng******

Abstract: ***This article employs data mining technology to investigate the factors that impact economic fluctuations and applies financial network theory to the investment strategies transfer problem. This approach serves as an efficient research method for studying economic behavior. Additionally, to demonstrate the impact of both the time scale and the degree of network evolution, this article computes the fund network parameters quantitatively by building the financial network's topological characteristic index. Furthermore, this paper builds a data mining model for economic swings and employs data to confirm the outcomes of the approach suggested in this article. The experimental findings demonstrate the potential value of the data mining technique discussed in this article for identifying the pertinent economic drivers and analyzing the variables influencing economic swings.***

• Keywords: *big data; mining data; economic; finance.*

Date of receipt: 14th December, 2023

Date of delivery revision: 25th December, 2023

Date of receipt revision: 20th March, 2024

Date of approval: 25th March, 2024

1. Introduction

Countries worldwide have developed into interconnected and interdependent organisms through economic activities like trade and investment due to the ongoing growth of economic globalization and world economic integration. However, the regular enactment of new economic policies has complicated international economic relations, undermined the stability of the nation's economic structure, and increased policy uncertainty, all of which have a negative impact on macroeconomic fundamentals and slowed the rate of economic recovery. The term "economic policy uncertainty" does not yet have a recognized definition. The prevailing opinion holds that economic policy uncertainty results from the discrepancy between economic actors' actual and expected beliefs about how economic policies affect the economy and that economic policy uncertainty is intimately linked to economic operations and economic policies (Huang et al., 2023).

The market's volatility allows for mismatches and delays in implementing economic policies, which leads to policy uncertainty since the government's resource allocation does not yield the desired results. Based on the notions of measurement, the existing approaches to quantify the uncertainty of economic policies may be categorized into three groups: state quantity estimation technique, subjective predicted deviation method, and proxy index substitution method.

The more frequently occurring terms, like "economic uncertainty," in statistics newspapers and publications, the more popular the proxy index substitution strategy becomes. This approach holds that the media needs to represent public opinion on the economy and the creation and impact of economic policy. Economic uncertainty can be represented to a certain extent by tallying the frequency of occurrence of keywords associated with uncertainty. Nevertheless, the selection of media and newspapers is only based on the subjective preferences of statisticians, and the opinions expressed in these outlets do not necessarily reflect the subjective opinions of all participants in the economy.

The impact of significant events on the politics, cultures, and economies of different nations varies. The financial market is also significantly impacted, as it is a fundamental aspect of global development. The financial market is fundamental to the social economy. As the securities market is its most significant component, it can serve as a proxy for the financial market in certain situations. Important events will impact the correlation between stock markets and create volatility in the stock market.

Currently, more research needs to be done on how the occurrence of significant events affects the stock market. Some scholars only use the univariate GARCH model to discuss the volatility of a particular stock market without considering the correlation between the markets. Other scholars consider the market correlation

** Amazon.com; email: hollyhhoang@gmail.com*

*** Luminator Technology Group; email: nhathafiss@gmail.com*

**** National Economics University; email: binhminh279@gmail.com*

***** Vinfast, 7 Bằng Lăng, Long Biên; email:hoangcan9630@gmail.com*

and use the multivariate GARCH model to analyze the stock market. It is necessary to recognize the securities market's impact on the populace's social life and the nation's development. Thus, whether one is interested in the advancement of society or investors' investment decisions, it is practically essential to investigate the effects of significant events on the correlation between the stock markets (Gunawan, 2021).

This article is organized as: The introduction, which covers the background, status, motivation, and significance of the research, is the first section. The quantitative approaches to studying economic fluctuations are compiled and analyzed in the literature review's second section. This part aims to enhance the big data algorithm, which serves as the foundation for the fourth part's clever strategy. This article is divided into the model construction section (the fourth part) and the system experiment section (the fifth part). The research for this essay is presented in the conclusion. Next, a synopsis and future work outlook are given.

The following are this article's primary contributions: (1) Big data approaches are merged with financial network theory to understand the phenomenon of economic fluctuations and dynamically identify the changing process of fund investment strategies. (2) In the big data era, it offers a valuable technique for forecasting and analyzing economic swings. In order to determine the primary causes influencing economic fluctuations using data mining, this article investigates economic fluctuations using big data technologies (Zhang, 2020). Additionally, in order to confirm the method's dependability, this paper integrates experimental research to assess the impact of economic fluctuation forecasting.

2. Related work

GARCH and VAR family models are typically used by academia to quantify market spillover effects. Huang et al., 2023 investigated the connection between the volatility spillover effects of major international financial markets and the United States' quantitative easing program using the recursive VAR approach. It is discovered that the US's unorthodox monetary policy significantly impacts volatility spillovers and possible global systemic vulnerabilities. Using a mixed-frequency VAR model, Gunawan, 2021 calculated the time-varying spillover effects between the stock and bond markets and the nation's real economy. According to the study, there is a considerable time-varying spillover impact between the two markets and the real economy, and this effect grew stronger during the financial crisis.

The TVP-VAR model was utilized by Minh et al.,2015 to compute the time-varying volatility spillover index. The offshore RMB exchange rate and the onshore exchange rate have an asymmetric two-way volatility spillover, as noted by Minh et al.,2015 According to Zhang, 2020 there was a leverage effect and a minimal spillover effect of the sample interest rate's volatility on the stock index following the financial crisis. The sample countries' stock index volatility also had an enhanced impact on the stock index's volatility. There are notable time-varying aspects to the volatility spillovers between financial markets. The impact of volatility spillover across 21 stock markets in Asia, Europe, Africa, and the Americas was studied by Zhang, 2020. A wavelet multiresolution BEKK-GARCH model was developed for the return sequence of the stock and foreign currency markets. The foreign exchange and the stock markets have a one-way volatility spillover impact in the low-frequency domain and a two-way volatility spillover effect in the high-frequency domain.

Zhang, 2020 confirmed the short- and long-term impacts of US quantitative easing on gold prices using event research and rolling regression techniques. The findings demonstrate that quantitative easing programs have a major long- and short-term effect on gold prices. By creating static and dynamic volatility spillover indices, Minh et al., 2018 investigated the volatility spillover effects between global crude oil prices, US economic instability, and Chinese stock markets. In order to conduct an empirical investigation on the spillover effects between China's stock market, foreign exchange market, and currency market, Cazal, 2015 chose the vector autoregressive model and the asymmetric BEKK model. The spillover effects among four crude oil markets, including China, were examined by Ming, 2018. Ellis and Cazal, 2015 investigated the volatility spillover effects of China's energy stock markets, fuel oil futures, and spot prices using the VAR-BEKK-GARCH model. The empirical findings indicate that fuel futures and the spot have a two-way volatility spillover effect. In contrast, the fuel oil futures market only experiences a one-way volatility spillover effect from the energy stock market.

3. Overview of big data algorithms

3.1. Apply big data algorithms in the analysis of financial parameters

Big data contains large, structured and unstructured data set which can be leveraged to address persistent business problems for global financial services and banking firms are called "big data" in the finance industry (Ming, 2018). The phrase is now seen as a commercial necessity rather than being limited to technology. Financial services companies are increasingly using it to change their organizations, procedures, and the sector as a whole.

Big data is based on the four Vs: volume, variety, veracity, and velocity. Financial institutions are looking for innovative methods to use technology to increase efficiency due to growing competition, regulatory restrictions, and client demands. Businesses can leverage specific features of big data to obtain a competitive edge, depending on the industry. The rate at which data must be evaluated and stored is called velocity. Every day, the New York Stock Exchange gathers one terabyte of data. An estimated 18.9 billion people were connected to networks as of 2016, meaning that each individual on Earth has around 2.5 connections.3. Cisco. "Cisco's VNI Forecast Projects the Internet Will Be Four Times as Large in Four Years." Financial institutions can differentiate themselves from the competition by concentrating on processing deals quickly and effectively.

3.2. Apply big data algorithms in financial network algorithms

The correlation coefficients between N funds can be used to determine the creation of a fund network of N funds. Use formula (1) below to get the distance between funds. N funds will create a distance matrix of N × N if the hypothesis test of the correlation coefficient between the funds is ignored. Using the distance matrix between the funds, a complete graph depicting the real strategy network of the funds may be created. A basic graph with edges connecting every pair of distinct vertices is called a complete graph. As a result, the entire graph's fund strategy network contains many data and is difficult to manage. As a result, the entire graph's fund strategy network contains many data and is difficult to manage. To create the final fund actual strategy financial network, it is therefore required to apply a particular method to filter out some unnecessary edges from the fund network while keeping the valuable actual strategy edges (Minh et al., 2023). The final fund actual strategy financial network is then created using the planar maximum filter graph approach and the least spanning tree method, starting with the fund distance matrix.

$$\sum_{k=1}^{n} \tilde{r}_{ik}^{2} = 1 \quad (1)$$

Among them, $\tilde{r}_i^2$ is the time series of the net value of fund *i*. The *n* records of the vector $\tilde{r}_i^2$ in the same time interval are taken as the distance between the points of the *n*-dimensional vector.

Prim's method and Kruskal's algorithm are the two fundamental minimum spanning tree algorithms. The Kruskal algorithm's basic idea is to begin with the connection edges and work your way down to the connection edges that satisfy the requirements in order to produce the final minimum spanning tree network. Prim's approach finds the final minimum spanning tree network by iteratively expanding around nodes and identifying each node and connecting edge in the network individually. The two algorithms yield the same outcome in the end, and there are no significant differences between them. This article shows how to screen the distance matrix's edges step-by-step using Kruskal's algorithm in order to get the smallest spanning tree network. The following are the precise techniques used in Kruskal's algorithm. The algorithm chooses the edge with the lowest weight by placing the weights of all related edges-that is, the fund's distance-in ascending order. Until the N−1 edges are picked, the edge with the smallest weight is chosen from the unselected edges in each phase so that it does not create a circle with the selected edges.

Assumed to be a hypermetric space is the space of N funds. This hypothesis is motivated by the "posterior" motive, which means that the study findings derived from it have economic significance. The space where the distance between objects is equal to the super metric distance is called the super metric space. The first two characteristics of distance are satisfied by the super metric distance, namely:

$$\hat{d}_{ab} = 0 \sim \text{a=b and } \hat{d}_{ab} = \hat{d}_{ba}$$

But the characteristic (3) of distance $\hat{d}_{ba}$ the hypermetric inequality, specifically, takes the place of the triangle inequality. The paper by Rammal et al. provided a detailed introduction to the ideas around hypermetrics. A set of N objects can be segmented according to a specific metric distance relationship to yield several super metric spaces. The sub hypermetric space is the most straightforward and well-suited of all the potential hypermetric structures that correspond to distance $\hat{d}_{ab}$ Finding the lowest spanning tree connected to the N objects will yield the subsupermetric space in the metric space where the N things are associated collectively. A unique exponential hierarchical tree, or hierarchical tree, corresponds to the minimal spanning tree of the subsupermetric space and can be used to calculate the super metric distance matrix (Cazal, 2015).

The foundation of the exponential hierarchical structure tree is the hierarchical clustering method, which uses the N×N distance matrix and the N items to be clustered in a hierarchical fashion. The following are the fundamental steps in the hierarchical clustering approach. The method first divides each system object into a single category, producing a total of N categories. The separation between the objects within each category equals the distance between them. To reduce the number of system categories, the algorithm locates the two categories in the system that are closest in distance and combines them into a new category. The distance between each old class and

the new class is recalculated by the algorithm. Until all the objects in the system are eventually combined into a single category (which contains N objects), the algorithm repeats stages two and three.

Based on the various techniques used to calculate the distance between clusters in step 3 of the clustering principle, the hierarchical clustering approach can be split into three categories: single linkage cluster analysis, average linkage cluster analysis, and complete linkage cluster analysis. The distance derived by the single-link clustering method is equal to each member of the over-metric distance matrix $\hat{d}_{ab}$, and it is used in the paper's index hierarchical structure tree to reflect the hierarchical relationship of the real strategies between funds. The method of creating the minimal spanning tree is depicted in Figure 1, and the unique exponential hierarchical structure tree is correlated with the nonunique minimum spanning tree.

In order to guarantee that more useful information is kept in the financial network and prevent significant filtering of information on the fund's actual strategy network, the Planar Maximally Filtered Graph increases the number of edges in the least spanning tree. The distance matrix creates a whole graph, which serves as the foundation for the plane maximum filter graph. If the graph is plane, the sum of the distances is minimized. There are some key distinctions between the least spanning tree approach and the planar maximum filter graph construction process. There are distinct limitations on the edges. MST stipulates that there cannot be loops on the spanning tree's edges. In order to ensure that all edges on the final network graph can be drawn on a plane without crossing out, PMFG removes this limitation and requires that all edges be on a plane graph. The quantity of edges varies. There are N−1 edges on MST and 3N−6 edges on PMFG for a network graph with N nodes. The Kuratowski theorem of plan graphs states that PMFG can only support three or four factions. The entire graph with N nodes in the network graph's subgraph is referred to as the "N faction." (Zhang, 2020).

Compared to MST, PMFG's structure is more intricate, but it preserves more useful details about the fund's real strategy and works better as a supplement to MST. It passes since the MST approach is not unique and because its screening of fund network data is severe. The efficacy of the MST approach can be confirmed by analyzing the topological properties of PMFG and MST in terms of time evolution and time scale. Furthermore, the three and four factions in PMFG have the ability to identify faction traits do not present in MST that are connected to the fund's real strategy. The relationship between the actual strategies of all 94 selected funds in the fund market is represented by the actual fund. Custering features of funds that share a strategy on the network diagram can provide insight into the strategy of the actual fund and if it aligns with the declared strategy, based on the actual strategy network. The position of the fund node in the actual strategy network of the fund will change when examining the effects of time evolution on the fund's actual strategy and the change in time scale on the fund network structure. The correlation coefficient of the final spanning tree (MST, PMFG), average value, standard tree length, average network path length, average network aggregation coefficient, and central node make up the financial network topological characteristic index.

3.3. The evaluation of fund strategy

The degree of correlation between the funds' actual strategies is shown by the position relationship of nodes on the actual strategy network of the fund. When two nodes in a fund's actual strategy network connect, it means that the two funds' actual strategies are either the same or comparable. The correlation between the nodes on the fund's actual strategy network and the actual strategy similarities between funds increase with increasing mean values of the correlation coefficient. The mean values of the correlation coefficients ρ of the minimal spanning tree and the plane maximum filter graph are determined using equations (2).

$$\left(\rho(\Delta t)\right) = \frac{1}{N-1} \sum_{\rho_{ab} \in R_{e,T}^{\Delta t}} \rho_{ab} \qquad (2)$$

N is the number of fund nodes, and $R_{e,T}^{\Delta t}$ is the correlation coefficient matrix under the condition of the significant correlation coefficient. Among them, ρ(Δt) represents the mean value of the correlation coefficients of the fund's actual strategy network on the time scale M and the time period T under the minimum spanning tree and planar maximum filter graph methods, respectively.

Every node in the network graph has a non-uniform degree distribution. While some nodes have tiny degree values, others have enormous degree values. On the interpersonal network, this trait is readily apparent. The node with the highest degree value, which is referred to as a key node, is often ranked first. Key nodes can frequently reflect the features of the network because of their huge degrees and strong correlations with other nodes (Cazal, 2015). The nodes in the network with the highest node degree are referred to as key nodes in the article.

Over time, the actual strategy of nodes inside the fund's actual strategy network is subject to ongoing change. Fund managers will adjust their real strategy based on their own technical capabilities as well as the state of the market. In the context of the fund market as a network, nodes exhibit correlations with one another. The most popular actual strategies in the fund market are represented by key nodes, which indicate nodes with a

higher degree of correlation between the fund and the actual strategies of other funds. It is important to note that it does not have the greatest influence on the fund's actual strategy network.

4. The role of big data in evaluating economic fluctuations

4.1. Model

The forecasting process of the model is primarily split into three steps. The stage of prediction is the second. Its primary goal is to identify the best ARIMA model for predicting each independent component according to the properties of its individual data set. The reconstruction step is the third phase. Its primary goal is to use an inverse process to reconstruct each independent component's projected value, which becomes the predicted value of the original time series. To mitigate the potential effects of varying sample data sets on the experimental outcomes, the experiment will be conducted again until each stock in the bank stock pool is chosen at least once. By averaging the times across all data sets, the ultimate outcome will also be shown.

4.2. Discussion

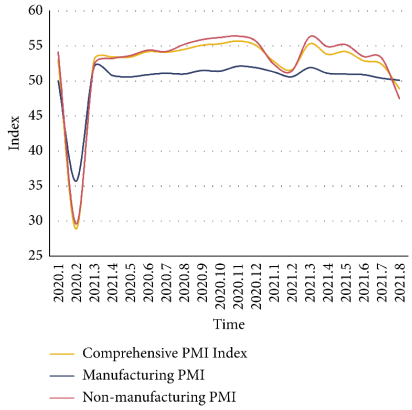
This article chooses the PMI index to create the appropriate experimental data set for the experiment and runs the simulation test in Matlab to confirm the efficacy of the model suggested in this article in the economic market. Drawing from the aforementioned analysis, this article computes the PMI index for the past several years and presents the results in a statistical chart. It also applies big data mining techniques to analyze the elements that influence economic swings. as shown in Table 1 and Figure 1.

Table 1: Statistical table of economic volatility index

Index	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20
Comprehensive PMI index	53	28.9	53	53.4	53.4	54.2	54.1	54.5	55.1	55.3
Manufacturing PMI	50	35.7	52	50.8	50.6	50.9	51.1	51	51.5	51.4
Nonmanufacturing PMI	54.1	29.6	52.3	53.2	53.6	54.4	54.2	55.2	55.9	56.2
Index	**Nov-20**	**Dec-20**	**Jan-21**	**Feb-21**	**Mar-21**	**Apr-21**	**May-21**	**Jun-21**	**Jul-21**	**Aug-21**
Comprehensive PMI index	55.7	55.1	52.8	51.6	55.3	53.8	54.2	52.9	52.4	48.9
Manufacturing PMI	52.1	51.9	51.3	50.6	51.9	51.1	51.0	50.9	50.4	50.1
Nonmanufacturing PMI	56.4	55.7	52.4	51.4	56.3	54.9	55.2	53.5	53.3	47.5

The aforementioned study serves as the foundation for counting the analysis findings of the elements causing economic oscillations and calculating the prediction accuracy of those components. Through the use of a simulation platform, the system in this research is compared to the literature in order to assess the statistical impact of the statistical economic fluctuation index as well as the analytical impact of the components that influence economic fluctuation.

Figure 1: Statistical diagram of economic fluctuations



5. Conclusion

It is challenging to evaluate the economic uncertainty of the present or even predict the future, and data mining frequently chooses historical data for the statistics of keyword frequency. The efficient market hypothesis states that there is no spillover effect between financial markets since all types of information will be received by all markets simultaneously and in the shortest amount of time. The term "mean spillover" describes how shifts in one market's asset prices or returns have an impact on shifts in other markets' asset prices or returns. The volatility of asset prices in one market influencing the volatility of other markets is known as volatility spillover. This phenomenon is typically quantified by the conditional variance of prices or returns. In order to conduct research and compute economic fluctuations, this article integrates real data with a data mining-based analysis model of the elements causing economic fluctuations. Verification reveals that this article's suggested data mining method can reliably extract pertinent economic indicators and be a valuable tool for analyzing swings in the economy.

References:

F. Huang, W. Chi, L. Yao, J. Yu and Y. Li, "Reconstruction Optimization of Economic Operation of Distribution Network Based on Data Mining Algorithm," 2023 IEEE 4th Annual Flagship India Council International Subsections Conference (INDISCON), Mysore, India, 2023, pp. 01-06, doi: 10.1109/INDISCON58499.2023.10269804.

Gunawan, "Data Mining for Revealing Relationship Between Google Community Mobility and Macro-Economic Indicators," 2021 9th International Conference on Information and Communication Technology (ICoICT), Yogyakarta, Indonesia, 2021, pp. 478-482, doi: 10.1109/ICoICT52021.2021.9527431.

H. Zhang, "Research on the Application of Big Data in Industrial Structure Adjustment and Economic Indexes," 2020 International Conference on Intelligent Transportation, Big Data & Smart City (ICITBS), Vientiane, Laos, 2020, pp. 687-690, doi: 10.1109/ICITBS49701.2020.00151.

J. Cazal, "Predictive Models of Economic Systems Based on Data Mining," 2015 International Workshop on Data Mining with Industrial Applications (DMIA), San Lorenzo, Paraguay, 2015, pp. 61-65, doi: 10.1109/DMIA.2015.20.

J. Ming, L. Zhang, J. Sun and Y. Zhang, "Analysis models of technical and economic data of mining enterprises based on big data analysis," 2018 IEEE 3rd International Conference on Cloud Computing and Big Data Analysis (ICCCBDA), Chengdu, China, 2018, pp. 224-227, doi: 10.1109/ICCCBDA.2018.8386516.

THE MODERATING EFFECT OF FINANCIAL LITERACY ON FINANCIAL ATTITUDE AND ENTREPRENEURIAL INTENTION AMONG BUSINESS STUDENTS

PhD. Do Thi Hai Ninh*

Abstract: ***The spread of the COVID-19 pandemic has tremendously influenced the economies of individuals and nations. Because of this consequence, young people need to seek ways to participate in building a business to grow their earnings and ensure their financial status. By using quantitative research methods analyse the factors that influence a phenomenon, the study aims to investigate the entrepreneurial intention of Vietnam's Generation Z. Financial literacy, and financial attitude were the two variables used in the study to describe the young generation's intention to start their own business. As a result, decision-makers in government and financial institutions need to emphasise the attitude factor among young people to encourage them to pursue entrepreneurial intention. Then, universities should consider including financial education in their students' curriculum to enhance young people's knowledge and experience with financial knowledge.***

• Keywords: *entrepreneurial intention, financial knowledge, financial attitude, generation Z.*

JEL codes: D03, D11, E21

Date of receipt: 27th December, 2023

Date of delivery revision: 02nd January, 2024

Date of receipt revision: 20th February, 2024

Date of approval: 21th March, 2024

1. Introduction

The COVID-19 epidemic has not only had a detrimental effect on the economy but has also hurt people's incomes and living standards. According to Natsir et al. (2021), during the COVID-19 pandemic, more people, particularly younger people, are interested in beginning new businesses or making financial investments. Because young people are technologically savvy and have access to a wealth of knowledge through social network sources, they have an increased desire to pursue entrepreneurial intention even when confined to their homes for extended periods. This is especially visible in newer firms that have only recently begun and have younger individuals serving as their founders.

According to the Vietnam Securities Depository Center data, the number of individual investors who participate in the stock market continues to set new records. Typically, in October 2022, there were 96,427 new accounts, which helped bring the total number of individual investors to 6,709,181 accounts (Vietnam Insider, 2022), equivalent to about 6.8% of the population. Because of the large number of investors who took part in the market, Vietnam's capital market grew more quickly than markets in other nations. As a result, it is essential to be aware of the intentions and behaviours of individual investors of a younger generation about financial investment. Not only are younger individuals interested in investing, but they are also interested in beginning new firms.

In particular throughout the COVID-19 outbreak. Many young people do not want to be restricted from an office thus as a method to realise their desire for independence, many prefer to undertake freelance work or start their own business. This freedom includes not just the freedom to make financial decisions but also the freedom to make decisions regarding one's time and management. Because of this, more young people are starting businesses than at any other time in history.

Entrepreneurship can be defined as the initiative to start a firm despite the conditions being unknown, with a strong passion to innovate and create while being willing to accept risks. According to Lee et al. (2006), the spirit of entrepreneurship is geared in many countries towards the concept of a "start-up nation." At the current time, there has been a favourable shift in the level of knowledge regarding entrepreneurship among younger people; yet, many variables are still required to support and promote entrepreneurial intentions. As a result, it is of the utmost importance to consider, investigate, and assess the elements affecting the intention to launch a new business. There is a lack of research that investigates the connection between students' financial literacy, attitude, and intention to engage in entrepreneurial activity. This is a limitation of other studies on students'

** School of International Business - Marketing, College of Business, University of Economics Ho Chi Minh City; email: ninhdth@ueh.edu.vn*

intent to engage in entrepreneurial intention. As a result, it is essential to research to understand better how students' financial knowledge and attitudes influence their desire to launch their own companies. In addition, entrepreneurship plays a significant part in promoting the country's economic development, which is especially vital in emerging nations like Vietnam. The role of entrepreneurial activities among students, particularly economics students, increasingly focuses on activities that build entrepreneurship and provide resources to promote economic development. This is especially true of the function of student-run businesses. As a result, a significant amount of research has been done in recent years on student entrepreneurs' intentions to start their businesses. These studies have focused mostly on the elements that affect such plans. However, the quantity of studies on entrepreneurial intentions from a financial viewpoint, such as financial literacy and financial attitudes, is still limited.

In addition, the COVID-19 pandemic has raised the unemployment rate, and ever since it did so, the number of students who intend to launch their businesses has grown. However, startup activities are influenced by various factors, including finances, environment, and knowledge... Because of this, this study aims to evaluate and examine the influence of financial literacy and financial attitudes on the intention to start a business among students, particularly economic university students. In addition, the research investigates how students' levels of financial literacy impact their plans to launch a new enterprise in the future.

2. Literature review

2.1. Theoretical background

It is widely accepted that intentionality and forethought are fundamental characteristics of humans. The expression of an intention represents the path that a future action will take. It influences individuals' decisions and drives and maintains their behaviour. The ever-expanding corpus of research on entrepreneurship has shed light on the important part that entrepreneurial ambition plays in the choice to launch a new venture (Kautonen et al., 2015). The conscious state of mind that comes before action and focuses attention on a goal, such as beginning a new firm, is what scientists mean when they talk about entrepreneurial intention. Many research (Fayolle et al., 2014) have recognised the theory of planning behaviour (TPB) as an application framework for investigating intentions. The TPB assumes that "behavioral intention" is comprised of three components: "attitude towards behavioral intention," "subjective norms," and "perceived behavioral control" (Khan et al., 2020). The TPB provides a consistent and universally accepted theoretical framework, which facilitates us comprehending and predicting entrepreneurial intention by considering personal and social factors. This understanding and prediction is made possible by the TPB's inclusion of both factors (Krueger et al., 2000). In addition, the TPB presented three proximal attitudinal elements that can predict entrepreneurial ambition, one of which is the attitude factor (Liñán & Chen, 2009). TPB's attitude and control variables often correspond to desirability and feasibility, which are components of Shapero & Sokol's entrepreneurial event model (Liñán, Rodrguez-Cohard, & Rueda-Cantuche, 2011). In the previous discussion, the TPB antecedents have been found to reliably predict the desire to engage in entrepreneurial intention in various research and settings. As a result, TPB is utilised in this proposed research as a reliable foundation for evaluating students' levels of financial literacy and their attitudes regarding entrepreneurial intention.

2.2. Hypothesis development

Over the past few years, researchers, practitioners, and policymakers have all been paying greater attention to the study of financial literacy (Lusardi, 2019). People are forced to make a variety of choices regarding their finances daily so that they can maintain their lifestyles. Students are the ones who need to enhance their financial knowledge and abilities to stabilise their financial activities, according to the research that was conducted by Lusardi (2019). When young people recognise that actively participating in financial investments will help them reach their financial goals. Nevertheless, investing money in the stock market is a challenging endeavour that calls for a higher level of expertise than simply depositing it in a savings account. When young people understand financial management better, it will be easier for them to develop entrepreneurial opportunities in the future. Hence, financial factors such as financial management and financial knowledge can influence entrepreneurial orientation.

Previous studies have demonstrated that young investors' levels of entrepreneurial behaviour are directly influenced by financial literacy. Financial literacy is a term used by some researchers to refer to understanding one's financial situation. These studies find that financial literacy has a beneficial influence on investing and entrepreneurial behaviour (Azhar et al., 2017). Financial literacy refers to the understanding of various financial concepts and practices, as well as the capacity to use this knowledge in various financial contexts. It is also possible to understand it as the understanding of how to manage and use money to accomplish various objectives. These purposes include monitoring financial issues and making proper decisions for financial investment. When an individual can comprehend and satisfy their financial investment requirements, they become capable of developing their potential for business ownership.

According to Remund (2010), the term "financial literacy" refers to a person's competency in managing money and includes the following five categories: (1) knowledge of financial concepts, (2) the ability to communicate about financial concepts, (3) the aptitude in managing personal finances, (4) the skill in making appropriate financial decisions, and (5) the confidence in effectively planning for future financial needs. In addition, Van Roij et al. (2011) research discovered that those with a high level of financial literacy are more likely to invest in the stock market than in business launches. Increasing one's level of financial understanding is the first step in assisting investors in lowering their exposure to financial risk. This is especially important considering the unpredictability of the Vietnamese market.

Additionally, individuals will be able to recognize more chances for financial investment if they increase their level of financial literacy. Not only does placing money into a bank account or participating in buying and selling shares on the stock market constitute financial investment, but so does using finance to start a business and manage that financing. Because most people place a higher level of trust in their expertise than in any other element (Aang & Ahnan, 2019), financial literacy directly impacts the investing intention of young investors. As a result, Hypotheses 1a and 1b were developed: "Financial literacy has a favourable influence on entrepreneurial orientation" and "Financial literacy has a positive influence on financial attitude."

Many investors, particularly young and individual investors, judge based on personal aspects like attitudes and behaviours rather than purely on their financial knowledge and understanding. This is especially true for young investors. A larger amount of attention has been paid to the topic of financial attitudes over the last decade, and a great number of studies have been carried out to comprehend and investigate the connection between financial attitudes and an orientation toward entrepreneurship (Yoopetch, C., & Chaithanapat, P. 2021). A person's financial attitude can be defined as a psychological predisposition that emerges while determining which financial activities are suitable for that person. In addition, Herdjiono and Damanik (2016) discovered that specific notions such as preoccupation, power, and effort can be used to reflect a person's financial attitude. While Park and Sela (2018) discovered that people tend to avoid making financial decisions that are incongruent with their style or emotional judgment, we found the opposite true. As a result, hypothesis H2 was proposed: the financial views have a beneficial influence on entrepreneurial intention.

This study suggests the strength of the connection between a person's financial attitude and their intention to start a business is predicted to increase as their level of financial literacy does. It indicates that knowing finances is a valuable resource for individuals when deciding whether to make an investment or start a new business. According to the prior study's findings, those who avoid taking risks are less likely to have the desire to engage in risky entrepreneurial intentions. Therefore, those with a higher level of financial literacy would be less likely to engage in risky investments and have less entrepreneurial intention, even though they tend to avoid taking risks more generally. According to the available research, those with high levels of financial awareness can participate in diverse activities. For this reason, financial literacy is believed to be a resource that is helpful for creative enterprises. It allows business owners to reject the mentality that company failure results from bad financial management. When business owners have a high level of financial literacy, they have a better chance of having constant access to new information and expertise to help them better manage their finances. In the end, acquiring financial information and knowledge could help facilitate the effective conversion of access to financing into the decision to start a new firm. As a result, we will state H3: the relationship between financial attitude and entrepreneurial orientation was moderated by financial literacy

3. Methodology

This study aimed to investigate the level of financial literacy and financial attitudes held by Generation Z, as well as the impact these factors have on their plans for financial investment. Quantitative research methods are utilised to analyse the factors that influence a phenomenon. The primary objective of this research is to ascertain whether or not young people in Vietnam make investment choices influenced by their financial literacy level. After completing a comprehensive assessment of the relevant literature, the questionnaire was designed and constructed. A pilot research was carried out to identify and resolve any issues that may have arisen while translating the question from English to Vietnamese. The measurement items were based on a 5-point Likert scale anchored by a scale ranging from "strongly disagree" to "strongly agree." The survey instrument was divided into two sections: (1) demographic characteristics and basic information about the entrepreneurship intention of the respondents and (2) measurement items. The data were gathered using a sample approach known as convenience sampling. The link to the online survey was disseminated to the business students through various social networking sites as well as through emails. After that, the gathered information was entered into the SPSS 25 program and coded for descriptive statistics analyses to check the reliability and validity of the results. The application of Smartpls 4.0 served to validate the hypothesis through structural equation modelling (SEM).

Since the respondents are business students in their second and third years, we investigated the information regarding their gender to better understand the sample distribution. The results have been compiled and are presented in Table 1 below. In terms of their gender, the majority of our respondents are female, which indicates that female students make up almost two-thirds of the population in Vietnamese business schools.

Table 1. Characteristics of respondents

Characteristics	Items	Frequency	Percent (%)
GENDER	Male	157	34.6
	Female	297	65.4

This research considers three variables: financial literacy, financial attitude, and entrepreneurial intention. Financial literacy was adopted by previous studies (Raut, 2020; Akhtar and Das, 2018). While financial attitude was adapted from Xiao and Wu (2006); Jorgensen and Savla (2010); Koropp et al. (2013) and Stolper and Water (2017). The entrepreneurial intention was taken on by Liñán & Chen (2009)

In order to carry out an analysis of the information obtained from the questionnaire in a manner that is consistent with the suggestions made by Anderson and Gerbing (1991), this research uses a two-step process. The first thing that needs to be done is an analysis of the measurement model, which will determine the validity and reliability of the study items. After that, the research hypotheses are tested to evaluate the structural model. Cronbach's Alpha was utilised throughout the process of doing the reliability analysis for the scales. If the value of Cronbach's Alpha is more than 0.7, it indicates that the factor is highly reliable (Hair et al., 2010). According to the findings in Table 2 below, the reliability of all the components considered for this research has a Cronbach's Alpha value greater than 0.8. This implies that the scales have a good internal consistency among the items. In addition, the average variance estimates (AVE) of all the variables are higher than 0.5, indicating that the measurements of all three constructs have high degrees of convergent validity (Fornell and Larcker, 1981). In addition, the Composite reliability also represents that both structures have a high level of dependability on their internal consistency.

Table 2. Construct reliability and validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
ENTREPRENEURIAL INTENTION	0,924	0,960	0,935	0,614
FINANCIAL ATTITUDE	0,860	0,875	0,893	0,549
FINANCIAL LITERACY	0,820	0,835	0,870	0,530

Comparing the average variance extracted (AVE) with the squared correlations was another way to evaluate discriminant validity. This comparison revealed that the two constructs were distinct from one another. According to Table 3, any of the constructs did not meet the recommended threshold of 0.5 for the average variance extracted (AVE). When determining whether or not each component of our investigation possesses an adequate level of discriminant validity, we consider whether or not the AVE values of the item are greater than the square of the correlation coefficient between the item and the other components located in the same row. Consequently, the AVE values of each item, which have been displayed in bold, are greater than all of the related squares of correlation coefficients in the same row of the table. This indicates that each component possesses a high level of discriminant validity.

Table 3. Discriminant validity (Fornell-Larcker criterion)

	ENTREPRENEURIAL INTENTION	FINANCIAL ATTITUDE	FINANCIAL LITERACY
ENTREPRENEURIAL INTENTION	0,784		
FINANCIAL ATTITUDE	0,321	0,741	
FINANCIAL LITERACY	0,359	0,705	0,728

Following an assessment of the study's reliability and validity, all of the research hypotheses based on the literature review were tested to ascertain whether the path coefficients were statistically significant. Bootstrapping approaches (Hair et al., 2010) were utilized to test the study hypotheses and to detect the non-normality issue brought about by the limited size of the sample pool. Estimating the degree of accuracy achieved by the PLS estimate can also be done using another nonparametric method called the bootstrap (Hair et al., 2010). Following the recommendations made by Ringle et al. (2010), several bootstrap samples were run 5,000 times.

The findings are presented in Table 4, and they indicate that financial literacy and financial attitude directly affect entrepreneurial intention. As can be seen in figure 1, the link between financial literacy and the entrepreneurial intention was partially mediated by financial attitude (t=2.293, b = 0.122, p=0.022). This finding is presented in the context of this study. Meanwhile, financial literacy had a moderating effect on the relationship between one's financial attitude and their entrepreneurial intention (t=3.111, b=0.098, p=0.002).

Table 4. Results of hypothesis testing

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
FINANCIAL ATTITUDE -> ENTREPRENEURIAL INTENTION	0,178	0,178	0,078	2,267	0,023
FINANCIAL LITERACY -> ENTREPRENEURIAL INTENTION	0,241	0,245	0,082	2,943	0,003
FINANCIAL LITERACY -> FINANCIAL ATTITUDE	0,686	0,688	0,036	19,301	0,000
FINANCIAL LITERACY x FINANCIAL ATTITUDE -> ENTREPRENEURIAL INTENTION	0,098	0,097	0,032	3,111	0,002

4. Discussion and Conclusion

Within the setting of Vietnam during the COVID-19 epidemic, the current study analyzed the primary elements that influence the entrepreneurial intention of the younger generation. Business investments need to be predicated on careful planning and strong financial knowledge to minimise the potential for loss. The COVID-19 epidemic is a unique time that affects and develops people's approach toward entrepreneurship in developing nations like Vietnam. This study is consistent with the previous study's findings, which found that a strong understanding of financial principles had a beneficial influence on the desire to start a business (Muhammad et al., 2021). It has been demonstrated, both via the findings of prior studies and the results of experiments conducted as part of the current research, that a nation can realize great success by increasing its population's financial literacy. In addition, the findings of this research indicate that the likelihood of young people intending to start their businesses may improve if they have a more developed understanding of and approach to financial issues. This will increase the number of new businesses, aiding in the drive against unemployment, one of the most pressing problems. Instead of looking for work, young people will start their businesses. In conclusion, the findings of this research contribute to a better understanding of how societies might use financial literacy to increase the likelihood that young people would start their businesses by encouraging a greater degree of entrepreneurial intention among younger generations (Kasim et al., 2014).

According to the findings, it was demonstrated that there is a connection between the variable of financial literacy and the intention to engage in entrepreneurial activity. When the younger generation recognises their learning environment, it will conclude that the investment decision will be made because of those grounds. This will bring about the desired consequence. People who lack financial literacy are more likely to make poor financial judgments, which can harm their current financial conditions (Lusardi and Mitchell, 2014).

The analysis of critical elements that explain the level of financial literacy in terms of each of its dimensions is the most important contribution this study has made to the previous studies conducted on the topic. The findings of this study have important impacts on the field of economics instruction. It was discovered via the segmentation of the investigation of financial literacy into each of its characteristics that students majoring in business have a greater financial knowledge base than students majoring in other subjects. In addition, the study sheds light on one of the most recent subjects that has been the subject of discussion locally and globally due to the ongoing economic slowdown and recession. This study contributes to the limited literature review currently available by providing insight into these key factors, including financial literacy and financial attitude, as well as the effect these factors have on the intention of young Vietnamese people to start their businesses.

According to the study results, having a strong understanding of finances has a beneficial effect on the entrepreneurship of students studying business in Vietnam. This will motivate many stakeholders in the country to focus on creating necessary plans and strategies to strengthen the start-up company orientation among the students. This would be a positive outcome. Unexpectedly, the level of financial literacy was found to have a moderating connection with the relationship between financial attitude and entrepreneurial intention. This finding was quite surprising, which may be attributed to certain cultural beliefs about entrepreneurship that were inculcated in respondents' minds.

Therefore, educational institutions such as universities, colleges, and schools need to provide the appropriate courses and curriculum to implant personal financial management and entrepreneurial skills among students at a young age. This may be accomplished by teaching students how to budget their money and start their businesses (Alshebami et al., 2020). It will also enlighten them about the benefits before they make their plans, help them make the appropriate financial decision, and prepare them to face uncertainties that will ultimately reflect the economy's performance by starting small entrepreneurial firms.

References:

Aang, K., & Ahnan, N. F. A. (2019). Financial Knowledge and Millennials Investing Behaviors in Indonesia. Jurnal Social Humaniora, 2019 Special Edition. http://dx.doi.org/10.12962/j24433527.v0i01.5768

Akhtar, F., & Das, N. (2018). Predictors of investment intention in Indian stock markets: Extending the theory of planned behaviour. International journal of bank marketing. https://doi.org/10.1108/IJBM-08-2017-0167

Alshebami, A., Al-Jubari, I., Alyoussef, I., & Raza, M. (2020). Entrepreneurial education as a predicator of community college of Abqaiq students' entrepreneurial intention. Management Science Letters, 10(15), 3605-3612. http://dx.doi.org/10.5267/j.msl.2020.6.033

Azhar, Z., Azilah, N., & Syafiq, A. (2017). Investment Awareness Among Young Generation. Proceedings of the International Conference on Business and Management Research (ICBMR-17). https://doi.org/10.2991/icbmr-17.2017.12

Fayolle, A., Liñán, F., & Moriano, J. A. (2014). Beyond entrepreneurial intentions: values and motivations in entrepreneurship. International entrepreneurship and management journal, 10(4), 679-689. https://doi.org/10.1007/s11365-014-0306-7

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18(1), 39-50. https://doi.org/10.1177/002224378101800104

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). Multivariate data analysis (7th Edition). Pearson Prentice Hall.

Koropp, C., Grichnik, D., & Kellermanns, F. (2013). Financial attitudes in family firms: The moderating role of family commitment. Journal of Small Business Management, 51(1), 114-137. https://doi.org/10.1111/j.1540-627X.2012.00380.x

Krueger Jr, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of business venturing, 15(5-6), 411-432. https://doi.org/10.1016/S0883-9026(98)00033-0.

Lee, S. M., Lim, S. B., Pathak, R. D., Chang, D., & Li, W. (2006). Influences on students attitudes toward entrepreneurship: a multi-country study. The International Entrepreneurship and Management Journal, 2(3), 351-366. https://doi.org/10.1007/s11365-006-0003-2.

Liñán, F., & Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. Entrepreneurship theory and practice, 33(3), 593-617. https://doi.org/10.1111/j.1540-6520.2009.00318.x.

Stolper, O. A., & Walter, A. (2017). Financial literacy, financial advice, and financial behavior. Journal of business economics, 87(5), 581-643. https://doi.org/10.1007/s11573-017-0853-9.

Vietnam Insider, November 10 (2022) available at: https://vietnaminsider.vn/6-8-of-vietnams-population-participates-in-securities-investment/.

Xiao, J. J., Sorhaindo, B., & Garman, E. T. (2006). Financial behaviours of consumers in credit counselling. International Journal of Consumer Studies, 30(2), 108-121. https://doi.org/10.1111/j.1470-6431.2005.00455.x .

Yoopetch, C., & Chaithanapat, P. (2021). The effect of financial attitude, financial behavior and subjective norm on stock investment intention. Kasetsart Journal of Social Sciences, 42(3), 501-508. https://doi.org/10.34044/j.kjss.2021.42.3.08.

ARTIFICIAL INTELLIGENCE AND BEHAVIORAL FINANCE: A QUALITATIVE SURVEY OF INDIVIDUAL INVESTORS' PERCEPTIONS OF THE USE OF AI AND ITS IMPACT ON THEIR BEHAVIOR IN THE VIETNAM STOCK MARKET

Ho Diep* - Le Do Thien Truc - Le Ngoc Bich* - Pham Quoc Hai*****

Abstract: ***With the arrival of the Fourth Industrial Revolution, as automation and Artificial Intelligence (AI) replaces workers with machines and computers, the difference between return on investment in new technologies and return on labor might be exacerbated. Hence, everyone is concerned about the shifts that are taking place in today's society since many new jobs will be created while many legacy positions will be lost. Therefore, in this paper, the authors want to do a survey on financial investors' perceptions of the use of AI and how it affects their behavior in the Vietnam stock market. The authors will try to explain the definition, application, advantages, and disadvantages of using AI, followed by the use of Behavioral Finance (BF) to clarify the topic of the research paper. The research concluded that there is a certain correlation between individual investors' perceptions of the use of AI and its impact on their behavior in the Vietnam stock market and the 3 hypotheses that the research proposed were all accepted. This study aims to bridge AI with BF.***

• Keywords: *behavioral finance (BF), artificial intelligence (AI), industrial revolution 4.0, finance, customer investment behaviors.*

Date of receipt: 28th November, 2023

Date of delivery revision: 25th December, 2023

Date of receipt revision: 20th March, 2024

Date of approval: 25th March, 2024

1. Introduction

Under the development of the Fourth Industrial Revolution, concepts such as Artificial Intelligence (AI) or machine learning (ML) are receiving attention from many people. Many studies have been conducted to clarify the role of behavioral finance (BF) in investment decisions or the application of AI in scientific fields, but very little research has been conducted to clarify the impact of AI on BF and its application in behavioral finance. Therefore, this thesis's major focus is not only discussing the definition and concept of AI, or its advantages and disadvantages, but also exploring topics that have not previously been analyzed, particularly in the financial sector. We will be using primary data, in the form of a survey questionnaire, and we will be analyzing the data qualitatively and quantitatively (via survey, Descriptive Statistics, Regression Analysis, Correlation Analysis, Cronbach's Alpha, etc.)

The objectives of this study review are as follows: i) Identifying the level of awareness and use of AI, as a tool, in investment by individual investors; ii) Assessing the implications of BF on the perception of using AI, and investors' gender and experience of investors; iii) Assessing the perception of usefulness of AI for businesses today. In addition, identify the effects of AI on future employment for workers.

This research is applied to individual investors on the Vietnam Stock Exchange to determine the perception of AI on BF on Individual Investors in the Vietnam Stock Market.

The research questions are as follows: What role does AI play in behavioral finance? and what are the opportunities and challenges of AI for future career opportunities?

2. Literature review

2.1. Artificial Intelligence (AI)

McCarthy (2007) found that artificial intelligence (AI) replicates human thinking and learning for computers, helping them acquire human intelligence. It can collect and analyze data, predict the future, and assist with financial services. AI exhibits behaviors

** International University, Vietnam National University Ho Chi Minh City*

*** Saigon University (Corresponding author; email: ldttruc@sgu.edu.vn)*

**** Ho Chi Minh City University of Economics and Finance, Vietnam*

such as planning, learning, reasoning, problem-solving, knowledge representation, and perception.

According to the OECD (2021), AI in finance can enhance competitive advantages for investors and financial businesses by providing customized financial services, reducing costs, improving decision-making, automating execution, enhancing risk management and regulatory compliance, and optimizing back-office processes. Thuy et al. (2018) discussed the rapid growth of AI, as well as the benefits and opportunities it has provided. It also discusses the situation of AI research and implementation in Vietnam. Viriato (2019) discusses the use of AI and ML in real estate investing. So far, with proptech (real estate technology), a result of AI and ML, will assist investors in improving their comprehension, efficiency, and accuracy in making investment decisions in the future. Bredt (2019) investigated AI can improve the financial sector by offering better opportunities, reducing costs, and developing new business models. It can also enhance efficiency in three ways: by assisting consumers, analyzing complicated data, and reducing resource usage.

2.2. Behavior finance (BF)

BF uses psychology to explain financial decisions. It explores how emotions impact investment judgments and stock market behavior. The goal is to provide a human perspective on finance and investment. Many theories, such as herding, anchoring, overconfidence, and loss aversion, explain stock price volatility.

Investors use anchor points or past trends as a starting point for investing in stocks, but studies show they rely too much on initial information (Tversky and Kahneman, 1974). Overconfidence bias leads to careless financial decisions due to the illusion of control. Overestimating one's knowledge and skills naturally leads to overconfidence (De Bondt and Thaler, 1995). The phrase "losses loom larger than gains" expresses loss aversion, which is an important notion in prospect theory (Kahneman and Tversky, 1979). People take more risks to avoid losses than to make gains. During market volatility and asset losses, investors often panic and make irrational decisions.

Rasetti (2020) mentioned new features of AI in the field of behavioral economics. When decisions are not always optimal, AI has the potential to eliminate market systemic risk and improve decision making based on the data acquired, ultimately improving investment performance. In general, behavioral finance (BF) and artificial intelligence (AI) engage in parallel but support each other to provide a significant advantage in market investing decisions.

3. Research model

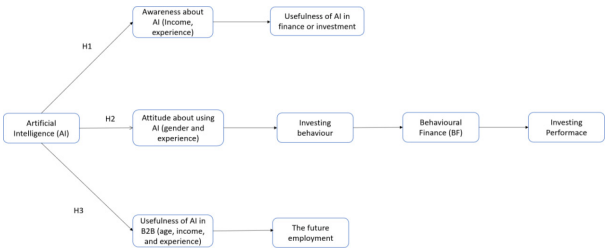
In the framework of Singh et al. (2020), but with slight modifications to adjust for less developed locales such as Vietnam. The term of AI for financial investment is still new. Therefore, the study identifies the awareness of AI is related to demographics in Vietnam. In this study, the authors propose three hypertheses:

H1: The awareness level of AI use is related to the income and experience of the respondent.

H2: The difference in attitude towards using AI in investment behavior and performance when applying it is related to the experience and gender (male or female) of the respondents.

H3: The perception of usefulness of AI for businesses and its impact on future employment opportunities are related to respondents' age, income, and experience.

Figure 1: Model for Artificial Intelligence and Behavioral Finance and its impact on individual investors' behavior in the Vietnam stock market



4. Methodology

4.1. Type of research

This study paper's main goal is to comprehend, investigate, and analyze the relationship between BF and individual investors in the Vietnamese stock market. Research that was descriptive was conducted for the study.

4.2. Sampling technique and sample size

The study examines data from 200 Vietnamese investors who trade on the Ho Chi Minh Stock Exchange (HOSE), the Hanoi Stock Exchange (HNX and Upcom), and other investors over the age of 18. Besides, a self-administered questionnaire was used to obtain data from them.

4.3. Research design

As it is a cross-sectional and survey-based study, this paper uses a quantitative and qualitative approach to accomplish the research objectives. To begin with, we used a questionnaire into 2 parts: personal information and research questions. In the framework of Singh et al. (2020), but with slight tweaks to account for less matured locales such as Vietnam. Questionnaires are distributed to respondents using social media. The survey question investigates the financial behavior of 200 investors as revealed by 5 observed questions and using a 6-point Likert scale to answer. All of the five questions involve the dependent variable, and they can be evaluated using six dimensions ranging from 0 to 5, with 0=very low, 1=low, 2=slightly low, 3=slightly high, 4=high, and 5=very high. The research was done by developing hypotheses that will guide the research.

4.4. Data collection tool

To conduct the study, both primary and secondary data has been used. The study is conducted using a primary methodology, and the data was collected via a questionnaire. SPSS software version 26 is used.

4.5. Research method

The purpose of this study is to conduct a survey and research on the perception of AI among individual investors in the Vietnam market and it is used as a tool for financial investment. Therefore, the study was conducted by two methods including qualitatively and quantitative methods via survey, Descriptive Statistics, Regression Analysis, Correlation Analysis, Cronbach's Alpha, etc.

4.6. Data collection and analysis

Demographic factor

The research shows the frequency and percentage of demographic independent factors including gender, age, marital status, educational qualification, occupation, income, and experience. Here is some main points about table with 200 people randomly selected to do the survey:

+ Females exceed males; about 66% are females.

+ In marital status, the respondents who were unmarried accounted for 65%.

+ In educational qualification, most of the respondents have a college or university education, this number accounts for 90.5%.

+ In occupation has a difference of 51% between the unemployment and employment respondents.

+ In terms of income, focusing mainly on the group from 5 to 10 million VND (about 42.5%).

+ In experience, most of them are young investors with less than 2 years of experience, around for 71.5%, about 143 people.

Descriptive analysis

The result of the answer varies from 0 to 5, which is refined into SPSS software from 1 to 6, valued by 6-Likert scales. In the first question about the awareness level of respondents, with a survey of 200 people and the mean answer received is 3.970. This means that respondents have a slightly high awareness of AI. The second question about the usefulness of AI and the likelihood that non-experts will use it in the future has an average value of 4.415, which means that most respondents think AI is quite useful and capacity a high probability will use it in finance or investment in the future. Next, in the third question, asking about the need for AI in behavioral finance, the mean answer was 4.160 which reflects whether AI is needed in investment behavior. The fourth question is about whether AI helps improve investment performance and how many percentages, due to the number of people using AI to invest is quite small and there are no AI users who can receive a return on investment of 100%, so the mean value of this answer equals 3,050. As for the last question about AI being useful for B2B companies, the answer has a relatively high mean, around 4.520, which shows that the majority of people agree that AI is useful for B2B companies.

Besides, the statistics of standard deviation may encounter some unpredictable obstacles. For questions 1, 2, 3, and 5, there is a relatively good standard deviation (standard deviation less than 1), meaning that most of the respondents' opinions are the same. However, for question number 4, the value of standard deviation is quite high, equal to 1.24711, which means that the opinions of survey participants are divers.

Table 1. Descriptive statistics

Question research	N	Minimum	Maximum	Mean	Std. Deviation
Have you ever heard of the term "Artificial Intelligence (AI)"?	200	1	6	3.970	1.01699
How much do you think AI is useful and will use AI in finance or investment in the future?	200	1	6	4.415	0.84042
How much do you think the need for artificial intelligence (AI) in investment finance behavior (BF) ?	200	1	6	4.160	0.82936

Question research	N	Minimum	Maximum	Mean	Std. Deviation
Do you think using AI will help improve your investment performance? and If yes, by what percentage (%) would it be better than not using AI?	200	1	5	3.050	1.24711
Do you think artificial intelligence (AI) is useful for B2B companies?	200	2	6	4.520	0.93486

Note: Table 1 contains six columns that explain the descriptive statistics. The first column provides the survey's questions. The second column is the number of survey participants for each question. The 3rd and 4th columns provide the minimum and maximum selection results of the answers, respectively. Column 5 is the average of all responses received. The last column represents the value of the standard deviation.

Cronbach's alpha

With 200 people to answer, we received 100% answers for each question and no results were excluded, meaning that the data of the study was not missing in any question.The total Cronbach's Alpha in this study equals 0.797 (> 0.6). In the total correlation coefficient, for 5 questions, all values are higher than 0.3. In relation to each variable's Cronbach alpha including the four questions (1,2,4, and 5) is lower than 0.797. This indicates that most of the study's variables are reliable.

Regression analysis

* Hypothesis 1

The study result shows that the sig values of variables including gender, marital status, educational qualification, income, and experience are all less than 0.05, this means that these five independent variables are correlated with the dependent variable.

Table 2. Model summary table

Model Summary[b]						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	Durbin-Watson
					R Square Change	
1	.612[a]	0.374	0.351	0.81912	0.374	1.830

a. Predictors: (Constant), Experience, Marital status, Gender, Educational qualification, Occupation, Income, Age
b. Dependent Variable: Have you ever heard of the term "Artificial Intelligence (AI)"?

Taylor (1990) stated that the R value is used to denote the correlation coefficient. R value is 0.612, meaning that the variables in the model have a slight high correlation. When most of the data points are concentrated close to the regression line, the R square value will be high. The R square value of 0.374 in Table 2 shows the independent variables included in the regression analysis account for 37.4% of the variance in the dependent variable. The value of DW = 1.830, Kutner and et al. (2004) found that the residuals of a regression model are tested for autocorrelation using the Durbin-Watson statistic.

The research result also shows that the model represents the level of the impact of the independent variables on the variable that is dependent. The regression coefficient can inform us which independent variable has a strong or weak effect on the dependent variable. The regression coefficients of these independent factors are all positive, indicating that the independent variables have a positive influence on the dependent variable; only the regression coefficient of marital status is negative, indicating that the independent variables have a negative effect on the dependent variable. Morever, we can see the sig. values of six variables including gender, age, marital status, educational qualification, income, and experience are all less than 0.05, this means that these six independent variables are correlated with the dependent variable.

Table 3. Model summary table

Model Summary[b]						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	Durbin-Watson
					R Square Change	
1	.505[a]	0.255	0.228	0.73849	0.255	1.861

a. Predictors: (Constant), Experience, Marital status, Gender, Educational qualification, Occupation, Income, Age
b. Dependent Variable: How much do you think AI is useful and will use AI in finance or investment in the future?

R value is 0.505, meaning that the variables in the model have a slight high correlation (Taylor, 1990). The R square value of 0.255 in Table 3 shows the independent variables included in the regression analysis account for 25.5% of the variance in the dependent variable, with the remaining 74.5% attributed to factors outside the model and random error. Besides, the value of DW = 1.861 ranges between 1.5 and 2.5 (Kutner and et al., 2004).

Table 4. ANOVA table

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.843	7	5.120	9.389	.000[b]
	Residual	104.712	192	0.545		
	Total	140.555	199			

a. Dependent Variable: How much do you think AI is useful and will use AI in finance or investment in the future?
b. Predictors: (Constant), Experience, Marital status, Gender, Educational qualification, Occupation, Income, Age

Table 5. Coefficients table

Coefficients[a]						
Model		Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
		B		Beta		
1	(Constant)	4.123	0.469		8.783	0.000
	Gender	-0.128	0.116	-0.072	-1.106	0.270
	Age	-0.278	0.086	-0.394	-3.220	0.002
	Marital status	-0.091	0.162	-0.052	-0.563	0.574
	Educational qualification	0.127	0.182	0.047	0.696	0.487
	Occupation	-0.124	0.201	-0.064	-0.618	0.537
	Income	0.316	0.106	0.315	2.978	0.003
	Experience	0.523	0.133	0.319	3.937	0.000

a. Dependent Variable: How much do you think AI is useful and will use AI in finance or investment in the future?

From all tables above, the result shows that the income and experience are more positive about the awareness of AI. There exists a significance between the perception of AI and the future use of AI in relation to the income and experience of the respondents. Therefore, we accept hypothesis H1.

* Hypothesis 2

The study result shows that the sig. value of independent variables including gender and experience is less than 0.05, this means that independent variables are correlated with the dependent variable. Besides, the Pearson correlation of both of them have values of 0.279 and 0.168, respectively, which means that the correlation with the dependent variable is slightly strong.

Table 6. Model summary table

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.365[a]	0.133	0.120	0.77800	1.864

a. Predictors: (Constant), Experience, Gender, Educational qualification
b. Dependent Variable: How much do you think the need for artificial intelligence (AI) in investment finance behavior (BF) ?

R value is 0.365, meaning that the variables in the model have a slight weak correlation (Taylor, 1990). The R square value of 0.133 in Table 6. Besides, the value of DW = 1.864 (Kutner and et al., 2004).

The regression coefficients of gender and experience variables are positive, indicating that the independent variables have a positive influence on the dependent variable. We can see the sig. value of gender and experience variable are less than 0.05 and the Pearson correlation of gender has a value of -0.2, this means that independent variables are slightly correlated with the dependent variable. On the contrary, the independent experience variable has 0.251, which means that the correlation with the dependent variable is relatively strong.

Table 7. Model summary table

Model Summary[b]					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.293[a]	0.086	0.072	1.20161	1.584

a. Predictors: (Constant), Experience, Gender, Educational qualification
b. Dependent Variable: Do you think using AI will help improve your investment performance? and If yes, by what percentage (%) would it be better than not using AI?

R value is 0.293, meaning that the variables in the model have a weak correlation. The R square value of 0.086 in Table 8 shows the independent variables included in the regression analysis account for 8.6% of the variance in the dependent variable, with the remaining 91.4% attributed to factors outside the model and random error. The value of DW = 1.584 (Kutner and et al., 2004).

In Table 8, the regression coefficient (B) of the experience variable is a positive sign, indicating that the independent variable has a positive influence on the dependent variable. And the regression coefficients (B) of the gender variable has a negative value, which means that the independent variable negatively affects the dependent variable.

Table 8. Coefficients table

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.008	0.667		4.509	0.000
	Gender	-0.404	0.184	-0.154	-2.203	0.029
	Educational qualification	0.012	0.293	0.003	0.040	0.968
	Experience	0.528	0.180	0.217	2.937	0.004

a. Dependent Variable: Do you think using AI will help improve your investment performance? and If yes, by what percentage (%) would it be better than not using AI?

The all tables above show that there exists a significant difference in attitude towards using AI in investment behavior related to the experience and gender (male or female) and the ability to improve performance when applying AI of the respondents. Therefore, we accept the H2 hypothesis.

* Hypothesis 3

The study result shows that the sig. values of variables including gender, marital status, income, and experience are all less than 0.05, this means that these 4 independent variables are correlated with the dependent variable. The most powerful is the experience variable.

R value is 0.420 in this situation, meaning that the variables in the model have a low correlation (Taylor, 1990). The R square value shows the independent variables included in the regression analysis account for 17.6% of the variance in the dependent variable, with the remaining 82.4% attributed to factors outside the model and random error. The value of DW = 1.738 ranges between 1.5 and 2.5, indicating that the results do not violate the assumption of first-order series autocorrelation (Kutner and et al. , 2004).

The Table 9 shows that there exists a significant difference between respondents' opinions about the perception of usefulness of AI for businesses and the demographics (age, income, and experience) of respondents. Therefore, we accept the H3 hypothesis.

Table 9. Summary of hypothesis

No.	Hypothesis	Status
1	The awareness level of AI use is related to the income and experience of the respondent	Accepted
2	The difference in attitude towards using AI in investment behavior and performance when applying it is related to the experience and gender (male or female) of the respondents	Accepted
3	The perception of usefulness of AI for businesses and its impact on future employment opportunities are related to respondents' age, income, and experience.	Accepted

5. Conclusion and recommendation

With the results obtained, we can still conclude that: The awareness level of AI use is related to the income and experience of the respondent. This result validates H1. Besides, with new investors, who have less experience, their opinion is that AI is quite useful when it can help them make decisions with high accuracy and quickly. In addition, the ability to use AI in the future is relatively high. With 200 investors, 71.5% have less than 2 years of investment experience, and having an income of 5 to 10 million VND is 42.5%. This proves that these are mostly new, less experienced, middle-income investors who still have the ability to increase their income in the future. Therefore, they are easily updated and ready to learn and apply new investment methods or technologies to improve their knowledge and income.

For hypothesis 2, the outcome results show that investment experience and gender are the significant variables that significantly explains the difference in attitude towards using AI in investment behavior and performance when applying it is related to the experience and gender (male or female) of the respondents. Therefore, the H2 is accepted. About 30% of the 200 investors who took part in the survey had more than two years of experience, which shows that they have a positive attitude towards using AI when they have a knowledge about the function and advantages of AI when utilizing it to reduce decisions based on temporary feelings in transactions. Besides, the remaining 70% of new investors gave the opinion that AI is necessary for customer investment behavior. The reason is from AI's ability to simultaneously, quickly, and accurately examine complex indications, data, and information. At the same time, AI can limit the risks of investment decisions from temporary emotions or psychology. Additionally, 132 out of the 200 survey respondents are female, and the outcomes indicate that females provide more favorable feedback than males on the necessity of AI in customer investing behavior pointed out the difference in attitude towards using AI between genders in how important of AI in investment behavioral decisions. However, in question research fourth about how using AI can improve their investment performance, the Standard deviation equals 1.24711 (greater than 1.0), which means that the opinions of survey participants are diverse. This comes from the fact that the majority of survey respondents are new investors and have not yet applied AI in their investments, so they do not know how much AI can improve performance. However, it is also reflected that people who use AI in investment say that AI can completely help them improve performance compared to not using AI.

For hypothesis 3, with the outcomes, we are able to come to the conclusion that AI is helpful for businesses and AI impact on future employment opportunities under the influence of age, income, and experience of respondent, which leads to accepting the H3 hypothesis. This may be caused by the reason that given the income, experience, and age of survey respondents, they will have a more view reliable, and realistic when AI is more and more popular and applied in many companies because of the great performance it brings such as the AI can use algorithms, process automation by machines and robots, etc to create products and service better and have higher accuracy. From them, creating opportunities and challenges for Vietnamese workers today, they are forced to improve their qualifications and professional capabilities to adapt the requirements of the Fourth Industrial Revolution.

References:

Bredt, S. (2019). Artificial Intelligence (AI) in the financial sector—Potential and public strategies. Frontiers in Artificial Intelligence, 2, 16.https://doi.org/10.3389/frai.2019.00016.

Burgess, N. (2021). Machine Earning–Algorithmic Trading Strategies for Superior Growth, Outperformance and Competitive Advantage. International Journal of Artificial Intelligence and Machine Learning, 2(1), 38-60. https://ssrn.com/abstract=3816567.

Dinh Anh Tuan (2020). Standardized Regression Coefficients Beta and Standardized Regression Coefficients B in SPSS. Accessed 6 November 2021. https://www.hocviendaotao.com/2020/01/he-so-hoi-quy-chuan-hoa-beta-va-chua.html.

Freund, R. J., Wilson, W. J., & Sa, P. (2006). Regression analysis (2nd Edition).

Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2004). Applied Linear Statistical Models (5th ed.). McGraw-Hill. https://users.stat.ufl.edu/~winner/sta4211/ALSM_5Ed_Kutner.pdf.

OECD (2021), Artificial Intelligence, Machine Learning and Big Data in Finance: Opportunities, Challenges, and Implications for Policy Makers, https://www.oecd.org/finance/artificial-intelligence-machine-learningbig-data-in-finance.htm.

Rahayu, S., Rohman, A., & Harto, P. (2021). Herding behavior model in investment decision on Emerging Markets: Experimental in Indonesia. The Journal of Asian Finance, Economics, and Business, 8(1), 53-59. https://doi.org/10.13106/jafeb.2021.vol8.no1.053.

Rasetti, M. (2020). The new frontiers of AI in the arena of behavioral economics. Mind & Society, 19(1), 5-9. https://doi.org/10.1007/s11299-020-00226-4.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. International journal of medical education, 2, 53. http://dx.doi.org/10.5116/ijme.4dfb.8dfd.

Viriato, J. C. (2019). AI and machine learning in real estate investment. The Journal of Portfolio Management, 45(7), 43-54. https://doi.org/10.3905/jpm.2019.45.7.043.

Waisi, M. (2020). Advantages and disadvantages of AI-based trading and investing versus traditional methods. https://urn.fi/URN:NBN:fi:amk-2020111222718.

INFLUENCE OF DIGITAL MARKETING ON THE INTENTION TO BUY APARTMENT: THE CASE OF SOUTHERN MARKET OF VIETNAM

PhD. Ruby Lieu*

Abstract: ***This study investigates the impact of digital marketing strategies on the intent to purchase apartments in the southern market of Vietnam, employing a quantitative research approach with 381 respondents. Utilizing the Theory of Planned Behavior as the theoretical framework, the research examines five key digital marketing strategies: Content Marketing, Social Media Marketing, Search Engine Optimization, Online Public Relations, and Affiliate Marketing. Findings indicate a significant positive relationship between these digital marketing strategies and purchase intention, with SEO identified as having the strongest unique impact. The study contributes to the literature by providing insights into the effectiveness of various digital marketing strategies in the real estate sector of Vietnam, suggesting a reevaluation of the use of social media marketing within this context. Implications for practitioners highlight the importance of a strategic, multi-channel approach to digital marketing to enhance purchase intentions among potential apartment buyers.***

• Keywords: *digital marketing, purchase intention, social media marketing, search engine optimization, affiliate marketing.*

JEL codes: M31, M37

Date of receipt: 27th December, 2023

Date of delivery revision: 04th January, 2024

Date of receipt revision: 20th March, 2024

Date of approval: 25th March, 2024

1. Introduction

The significance of digital marketing in the real estate sector, particularly in influencing the purchase intentions for apartments in the burgeoning southern Vietnamese market, cannot be overstated. As this region experiences remarkable economic expansion and urban development, digital marketing strategies have become crucial in bridging the gap between real estate developers and potential buyers. Digital platforms enable developers to present comprehensive details about their properties, including virtual tours and client feedback, broadening their reach, and impacting buyer decisions significantly (MH & Devaru, 2023).

In the context of southern Vietnam, where internet usage is widespread, and consumers increasingly rely on digital channels for information, digital marketing plays a pivotal role in shaping purchase intentions. Developers can customize their marketing efforts to align with the preferences and requirements of their target demographics, utilizing tools like SEO, social media, and online advertising to highlight key selling points such as location benefits, amenities, and competitive pricing. This tailored communication not only boosts project visibility but also fosters trust with potential buyers, influencing their decision-making process (Tien et al., 2020).

Moreover, the analytics offered by digital marketing afford developers critical insights into consumer behaviors and market trends, allowing for the fine-tuning of marketing strategies to better meet consumer demands. Through data-driven approaches, real estate companies can pinpoint the most effective tactics for engaging their intended audience, enhancing their marketing efficiency, and increasing sales conversions. As the southern Vietnamese real estate market continues to expand, the strategic application of digital marketing in influencing buyer intentions is increasingly becoming a linchpin for success within the industry (Le & Ratten, 2021).

A total of 135 businesses (102 brands, 20 agencies, and 13 media companies) were surveyed for the Vietnam Digital Marketing Market Picture 2019 by Phuoc (2020). The results show that 84% of businesses use social media marketing, followed by 52% for search engine marketing and 46% for content marketing. Businesses of all sizes and in all areas of real estate use social media marketing, but those dealing with apartment complexes and other types of real estate tend to use it more than others. Up to 94% of large and medium businesses and 79% of small businesses use this type of spending, according to that statistic. The other digital marketing strategies

*** International University (IU) - Vietnam National University HCMC (VNU.HCM); email: rubylieunguyenn@gmail.com***

used by medium and large businesses include online PR, affiliate marketing, and email marketing.

In order to promote consumer purchasing behavior in the near future, particularly to purchase intention, real estate businesses must know how to fully exploit the tools of digital marketing, which offer a variety of means and outstanding advantages.

2. Literature review

2.1. Theoretical foundations

2.1.1. Digital marketing

The goal of digital marketing is to raise brand recognition and sales by introducing and promoting products and services through digital channels. Digital marketing makes use of at least one online medium. Digital marketing is rapidly becoming an integral part of many companies' overall marketing strategies, and it plays a significant role in every company's marketing plan.

The real estate industry is just one of many that relies heavily on digital marketing (Kumar, 2014). The use of digital marketing strategies can increase the number of prospective clients and direct salespeople to the most suitable ones. Marketing via digital channels, such as social media, content, search engines, online public relations, affiliates, and email, has a positive effect on consumers' purchasing decisions (Desai & Vidyapeeth, 2019).

2.1.2. Buying intention

The concept of "buying intention" is vital to the field of consumer behavior studies because it represents the likelihood that a customer will actually make a purchase. Study after study in a wide range of fields has focused on this idea in an effort to piece together the complex web of internal and external influences that shape consumers' final purchasing decisions. One of the most important theories in consumer behavior is the theory of planned behavior. According to this theory, a consumer's attitude towards a product influences their final purchase decision. The strength of their intention to buy strongly predicts their actual behavior, considering their perceived behavioral control (Azmi et al., 2022). It is crucial to investigate the factors that encourage or discourage consumers' propensity to buy because of the strong correlation between intention and purchase.

The literature acknowledges a number of factors that impact consumers' intentions to purchase. Customers are more likely to make a purchase when they have all the information, they need to make an informed decision, and this includes their level of product knowledge (Low et al., 2020). One of the most important factors in a consumer's propensity to buy is their perceived value, which is based on how they weigh the pros and cons of the product. The influence of social influences, like the thoughts and deeds of people in the consumer's social circle, on their purchasing decisions is substantial, underscoring the role of word-of-mouth and social media marketing in the modern marketing environment. Crucial too are marketing communications that speak directly to consumers' wants and needs; these have the power to influence their opinions of the product and their propensity to purchase (Keller & Kotler, 2016). Marketers who want to create strategies that captivate consumers and turn their interest into sales must grasp these factors.

2.2. Theoretical framework

Analyzing the impact of digital marketing on the intent to buy apartments, specifically in the southern Vietnamese market, is guided by the Theory of Planned Behavior (TPB). An individual's attitude toward the behavior, subjective norms, and perceived behavioral control are the three most important factors that influence an individual's intention to perform a behavior, according to TPB, which was developed by Icek Ajzen (1991). Specifically, this study applies TPB to the question of how consumers' views on digital marketing (e.g., online ads, social media interactions), subjective norms (how much pressure or encouragement they feel from important others), and perceived behavioral control (how much control they believe they have over the purchase process) influence their intentions to buy an apartment. Using TPB, the research intends to analyze the mental processes that influence online homebuyers' intentions and provide light on how each aspect of TPB influences real estate transactions (Ajzen, 1991).

In addition, by serving as a theoretical framework, TPB enhances the study by offering a systematic way to investigate how digital marketing tactics influence real estate market consumer behavior. It permits a thorough examination of how much digital marketing affects the propensity to buy apartments, taking into account the complex interaction of personal attitudes, the impact of social networks, and the perceived ease or difficulty of navigating the online buying environment. Using this framework, we can better understand what motivates and hinders consumers in the south of Vietnam when making purchases, and we can use that information to create digital marketing campaigns that speak directly to those people. Understanding and predicting purchase intentions in the evolving Vietnamese real estate landscape is made easier by utilizing TPB in

this study, which highlights the multi-faceted and complex nature of consumer decision-making in the digital age (Ajzen, 1991).

2.3. Hypothesis development and research model

The burgeoning digital landscape has significantly transformed the real estate sector, particularly in the southern market of Vietnam, where digital marketing strategies are increasingly influencing apartment buying behavior. This discussion examines the impact of various digital marketing factors content marketing, social media marketing, search engine optimization (SEO), online public relations (PR), and affiliate marketing on apartment buying behavior, developing hypotheses based on existing research findings.

Content marketing: The first hypothesis (H1) posits that content marketing positively impacts apartment buying intention in the southern market. According to Pulizzi (2012), content marketing's effectiveness lies in its ability to engage potential buyers through valuable and relevant information, thereby influencing their purchase decisions. Studies by Kee and Yazdanifard (2015) support this, suggesting that high-quality, informative content significantly enhances brand trust and awareness, factors critical in the high-stakes decision of purchasing an apartment. Therefore, the strategic deployment of blogs, articles, and videos detailing apartment features, benefits, and community insights can be pivotal in driving purchase intentions.

Social media marketing: Hypothesis H2 proposes that social media marketing has a positive impact on apartment buying intention. Kaplan and Haenlein (2010) argue that social media platforms facilitate a two-way communication channel between buyers and sellers, enabling real estate companies to engage with potential customers, build relationships, and foster community. Furthermore, research by Mangold and Faulds (2009) highlights the role of social media in influencing buyers' perceptions and decisions through reviews, testimonials, and user-generated content, underscoring its importance in the purchasing journey.

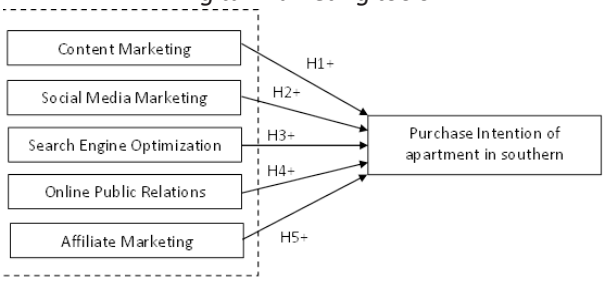
Search engine optimization (SEO): The third hypothesis (H3) asserts that SEO factors positively impact apartment buying intention. According to Chaffey and Bosomworth (2013), SEO enhances the visibility of real estate listings in search engine results, increasing the likelihood of engagement with potential buyers. Tuten and Mintu-Wimsatt (2014) further explain that strategic keyword optimization and quality content creation improve a website's ranking, drawing more traffic and potentially leading to higher conversion rates.

Online public relations (PR): Hypothesis H4 suggests that online PR activities positively impact apartment buying intention. Grunig (2011) emphasizes that online PR, through press releases, articles, and collaborations with influential bloggers and journalists, can significantly enhance brand reputation and credibility. This, in turn, can influence potential buyers' perceptions and confidence in purchasing apartments, as noted by Strömbäck and Kiousis (2019), who highlights the role of media visibility in shaping public perceptions and behaviors.

Affiliate marketing*:* Finally, Hypothesis H5 posits that affiliate marketing has a positive impact on apartment buying intention. Duffy (2005) discusses how affiliate marketing, by leveraging partnerships with websites, influencers, and brokers, can extend the reach of real estate offerings to niche markets and audiences that might not be reached through traditional marketing channels. Libai et al. (2003) support this view, suggesting that affiliate marketing can effectively drive targeted traffic, enhancing lead generation and conversion rates for apartment sales.

From above discussions, the research model is construsted as the following:

Figure 1. Research model



3. Methodology

A quantitative approach was used in this study. A questionnaire with a 5-point scale was used to gather research data (from Strongly disagree to Strongly agree). There were 400 questionnaires sent out, and 381 were returned, making the response rate 95.25 percent.

Following data cleaning, descriptive statistics were used to analyze the research sample's characteristics. Cronbach's Alpha coefficient and factor analysis were used to assess the reliability and value of the scale. EFA was employed to progressively eliminate variables with weights less than 0.5. When the Eigenvalue is more than 1, the total variance extracted is 50% or higher, the KMO coefficient value is between 0.5 and 1, and the scale is considered acceptable (Gerbing & Anderson, 1988).

4. Discussion of Findings

Table 1. Sample characteristics

		Frequency	Percent	Valid percent	Cumulative percent
Gender	1 Male	157	41.2	41.2	41.2
	2 Female	224	58.8	58.8	100.0
	Total	381	100.0	100.0	
Age	1 <25	8	2.1	2.1	2.1
	2 26-35	76	19.9	19.9	22.0
	3 36-45	149	39.1	39.1	61.2
	4 46-55	113	29.7	29.7	90.8
	5 >55	35	9.2	9.2	100.0
	Total	381	100.0	100.0	
Monthly Income	1 10 to less than 20 mil VND	5	1.3	1.3	1.3
	2 10 to less than 20 mil VND	171	44.9	44.9	46.2
	3 20 to less than 30 mil VND	176	46.2	46.2	92.4
	4 equals to or greater than 30 mil VND	29	7.6	7.6	100.0
	Total	381	100.0	100.0	

The descriptive analysis highlights the demographic breakdown of respondents, showing a higher participation rate from females (58.8%) and a dominant age group of 36-45 years (39.1%), and the most frequent monthly income level is 20-30 million VND at 46.2%. This demographic representation suggests that the study captures a broad perspective of potential apartment buyers, offering valuable insights into the preferences and behaviors of a key demographic segment in the southern Vietnamese market.

4.1. Reliability test

Table 2. Reliability test

	Cronbach's alpha	Corrected item-total correlation	Cronbach's alpha if item deleted
Content Marketing (CM)	.931		
CM1 The informative content about apartments (e.g., blogs, videos) helps me understand the benefits of the property.		.817	.916
CM2 Quality content provided by real estate developers significantly influences my interest in their apartments.		.863	.901
CM3 I find that engaging stories and articles about the apartment community make me more inclined to consider a purchase.		.846	.906
CM4 The detailed information about apartment features and amenities available online aids my decision-making process.		.822	.914
Social Media Marketing (SMM)	.899		
SMM1 Social media posts about apartments increase my awareness of available properties.		.625	.823
SMM2 Reviews and testimonials on social media platforms influence my opinion about an apartment's value.		.852	.842
SMM3 Interactive social media campaigns (e.g., live Q&A, virtual tours) positively affect my interest in an apartment.		.844	.845
SMM4 The frequency of seeing an apartment advertised on social media platforms enhances my purchase intention.		.791	.864
Search Engine Optimization (SEO)	.915		
SEO1 I am more likely to consider apartments that appear on the first page of my search engine results.		.773	.901
SEO2 The ease of finding information about apartments through search engines plays a crucial role in my purchase decision.		.812	.888
SEO3 SEO-optimized content makes me feel that an apartment is more reputable and trustworthy.		.846	.879
SEO4 Keywords associated with apartments significantly guide my online research and influence my interest.		.802	.890
Online Public Relations (OPR)	.817		
OPR1 Positive news articles and press releases about an apartment increase my interest in it.		.636	.770
OPR2 Collaborations between real estate developers and well-known online influencers make me more inclined to consider their apartments.		.657	.761
OPR3 Online reviews and ratings featured in reputable real estate publications affect my perception of an apartment's quality.		.630	.773
OPR4 Publicly available success stories of residents positively impact my purchase intention.		.627	.775
Affiliate Marketing (AM)	.841		
AM1 Recommendations from affiliate websites and influencers introduce me to apartment options I would consider purchasing.		.698	.788
AM2 Affiliate marketing promotions (e.g., discounts, special offers) increase my likelihood of considering an apartment.		.669	.802
AM3 Trustworthy affiliate partnerships make me more confident in the quality of the apartment being advertised.		.767	.756
AM4 I am more likely to visit an apartment's website if it is mentioned by a credible affiliate or influencer.		.575	.841
Purchase Intention (PI)	.749		
PI1 I am likely to consider purchasing an apartment in the southern market in the near future.		.617	.618
PI2 If I found an apartment that meets my criteria online, I would initiate the purchase process.		.605	.633
PI3 My research on apartments online has significantly increased my intention to make a purchase.		.514	.734

A Cronbach's alpha test was conducted to assess the internal consistency and reliability of the multi-item scales used in the survey. Values above 0.7 generally indicate good reliability. We can see all the scales (CM, SMM, SEO, OPR, AM) have Cronbach's alpha values between 0.817 and 0.933, suggesting that the items have relatively high internal consistency and are measuring the same underlying construct.

4.2. Corelation Analysis

Table 3. Correlation analysis

		PI	CM	SMM	SEO	OPR	AM
PI	Pearson Correlation	1	.319**	-.353**	.343**	.392**	.292**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	381	381	381	381	381	381

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

A correlation analysis was run to measure the strength and direction of the linear relationship between variables. We can see purchase intention (PI) has positive and significant correlations with all the digital marketing variables, indicating they are positively associated. In general, the positive correlations align with expectations that digital marketing activities relate positively to purchase intention.

4.3. Regression analysis

Table 4. Model summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.658[a]	.611	.602	.66817	2.078

a. Predictors: (Constant), AM, CM, SEO, OPR, SMM
b. Dependent Variable: PI

Table 5. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.514	.326		4.638	.000		
	CM	.373	.039	.397	1.852	.015	.668	1.498
	SMM	.219	.049	.229	4.430	.000	.687	1.455
	SEO	.391	.046	.396	4.165	.000	.828	1.208
	OPR	.214	.048	.213	4.410	.000	.785	1.273
	AM	.345	.066	.367	3.733	.000	.913	1.096

a. Dependent Variable: PI

A multiple linear regression was conducted with purchase intention as the dependent variable and the digital marketing elements (CM, SMM, SEO, OPR, AM) as the predictors. The model has an R-squared of 0.611, meaning these variables explain 61.1% of the variance in purchase intention. The ANOVA shows the model is statistically significant. The Durbin - Watson coefficient of the model has a value of 2.078 and the variance magnification factor VIF < 10, so we conclude that the multicollinearity phenomenon of the model is insignificant. Looking at the coefficients, SEO, OPR and AM have the highest standardized betas, indicating they make the strongest unique contribution in explaining purchase intention when controlling for other factors. Overall, the regression highlights how these digital marketing factors positively and significantly influence purchase intention.

5. Conclusion and suggestions

Based on the data analysis, here are some key conclusions and implications:

- Content marketing, social media marketing, search engine optimization, online PR and affiliate marketing all have a significant positive relationship with purchase intention for apartments (Nyagadza, 2020; Alfiana et al., 2022). This aligns with past studies showing the effectiveness of digital marketing in influencing buying behavior across various industries (Ramesh & Vidhya, 2019; Pal & Shukla, 2020).

- Of the digital marketing elements examined, SEO has the strongest unique impact on purchase intention, followed by online PR and affiliate marketing (Beta values of 0.396, 0.213 and 0.367 respectively). This highlights the importance of visibility in search and building credibility through third-party endorsements. Similar findings were reported by Alfiana et al. (2021) in their study of digital marketing for real estate.

- The digital marketing factors explain a sizable 61.1% of the variance in purchase intention. This emphasizes how aptly targeted and optimized digital marketing campaigns can persuade prospective buyers. Marketers should leverage analytics to refine multichannel digital strategies to nurture consumers along the purchase journey (Azmi et al., 2022).

- Social media marketing has a negative correlation with content marketing and purchase intention. This suggests that social media ads and campaigns may not be as impactful for this audience compared to informative content. Real estate marketers should focus on content-driven social media engagement rather than hard-sell promotional tactics (Low et al., 2020).

- There are opportunities to expand beyond the factors examined here and optimize emerging formats like virtual tours, digital consultations, retargeting ads, chatbots etc. Continuous innovation in digital marketing techniques can help engage digitally savvy homebuyers (Low et al., 2020).

References:

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179-211.

Alfiana, F., Khoffifah, N., Ramadhan, T., Septiani, N., Wahyuningsih, W., Azizah, N. N., & Ramadhona, N. (2023). Apply the search engine optimization (SEO) method to determine website ranking on search engines. International Journal of Cyber and IT Service Management, 3(1), 65-73.

Azmi, A., Ibrahim, R., Abdul Ghafar, M., & Rashidi, A. (2022). Smarter real estate marketing using virtual reality to influence potential homebuyers' emotions and purchase intention. Smart and Sustainable Built Environment, 11(4), 870-890.

Azmi, A., Ibrahim, R., Abdul Ghafar, M., & Rashidi, A. (2022). Smarter real estate marketing using virtual reality to influence potential homebuyers' emotions and purchase intention. Smart and Sustainable Built Environment, 11(4), 870-890.

Chaffey, D., & Bosomworth, D. (2013). Digital marketing strategy planning template. Smart Insights, 1-14.

Desai, V., & Vidyapeeth, B. (2019). Digital marketing: A review. International Journal of Trend in Scientific Research and Development, 5(5), 196-200.

Duffy, D. L. (2005). Affiliate marketing and its impact on e-commerce. Journal of consumer marketing, 22(3), 161-163.

Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. Journal of marketing research, 25(2), 186-192.

Grunig, J. E. (2011). Public relations and strategic management: Institutionalizing organization–public relationships in contemporary society. Central European Journal of Communication, 4(06), 11-31.

HM, M. V., & Devaru, S. D. B. (2023). Digital marketing strategies in real estate for propertypistol realty pvt. Ltd, bengaluru. EPRA International Journal of Economics, Business and Management Studies (EBMS), 10(9), 32-38.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. Business horizons, 53(1), 59-68.

Kee, A. W. A., & Yazdanifard, R. (2015). The Review of Content Marketing as a New Trend in Marketing Practices. International Journal of Management, Accounting & Economics, 2(9).

Keller, K. L., & Kotler, P. (2016). Marketing Management. Pearson.

Kumar, B. (2014). Impact of digital marketing and e-commerce on the real estate industry. International Journal of Research in Business Management, 2(7), 17-22.

Le, N., & Ratten, V. (2021). Digital Marketing and Social Entrepreneurship in Vietnam. In Developing Digital Marketing: Relationship Perspectives (pp. 41-64). Emerald Publishing Limited.

Libai, B., Biyalogorsky, E., & Gerstner, E. (2003). Setting referral fees in affiliate marketing. Journal of Service Research, 5(4), 303-315.

Low, S., Ullah, F., Shirowzhan, S., Sepasgozar, S. M., & Lin Lee, C. (2020). Smart digital marketing capabilities for sustainable property development: A case of Malaysia. Sustainability, 12(13), 5402.

Mangold, W. G., & Faulds, D. J. (2009). Social media: The new hybrid element of the promotion mix. Business horizons, 52(4), 357-365.

Nyagadza, B. (2020). Search engine marketing and social media marketing predictive trends. Journal of Digital Media & Policy.

Pal, A. K., & Shukla, B. (2020). Impact of digital marketing on consumer buying behaviour. Iconic Research And Engineering Journals, 3(11), 209-220.

Phước, N. H. (2020). Marketing in Vietnam. The Economy and Business Environment of Vietnam, 93-109.

Pulizzi, J. (2012). The rise of storytelling as the new marketing. Publishing research quarterly, 28(2), 116-123.

Ramesh, M., & Vidhya, B. (2019). Digital marketing and its effect on online consumer buying behavior. Journal of Services Research, 19(2), 61-77.

Strömbäck, J., & Kiousis, S. (2019). Defining and mapping the field of theory and research on political public relations. Political public relations, 1-42.

Tien, N. H., Ngoc, N. M., Anh, D. B. H., Huong, N. D., Huong, N. T. T., & Phuong, T. N. M. (2020). Development opportunities for digital marketing in post Covid-19 period in Vietnam. Development, 1(5), 95-100.

Tuten, T., & Mintu-Wimsatt, A. (2018). Advancing our understanding of the theory and practice of social media marketing: Introduction to the special issue. Journal of Marketing Theory and Practice, 26(1-2), 1-3.

A DISCUSSION ON MEASUREMENT AND VALUATION TECHNIQUES USED IN FAIR VALUE ACCOUNTING

MSc. Huynh Tan Khuong* - MSc. Nguyen Thi Thanh Thuy*

Abstract: ***The advent of International Financial Reporting Standards (IFRS) presents an opportunity to modernize and unify accounting standards, establishing a benchmark for 'best practice' in fair value accounting. This is particularly pertinent when the valuation of assets and liabilities necessitates significant judgments and estimations. Currently, IFRS 13 Fair Value Measurement provides a singular, comprehensive source of guidance applicable to nearly all fair value estimations. For instance, when measuring the fair value of fixed assets, intangible assets, specified financial assets, or liabilities, various valuation techniques may be employed: the market approach, the cost approach, and the income approach. This article explores the different approaches, techniques, and methods used in measuring the fair value of assets and liabilities. The standards of fair value delineate three principal approaches to measuring the fair value of assets and liabilities: the market approach, income approach, and cost approach. Valuation techniques deployed to ascertain fair value should primarily utilize relevant observable inputs, minimizing the use of unobservable inputs. The valuation techniques employed to measure the fair value of an item should be applied consistently. A modification in a valuation technique or its application is permissible if it renders a measurement that is equally or more representative of the fair value under the given circumstances.***

• Keywords: *fair value, fair value measurement, valuation technique, market approach.*

Date of receipt: 12th October, 2023 *Date of receipt revision: 29th November, 2023*

Date of delivery revision: 19th October, 2023 *Date of approval: 16th January, 2024*

I. Introduction

Accounting academics and practitioners have been debating the reliability and relevance of fair value accounting. According to Financial Accounting Standards, fair value accounting, often referred to as mark-to-market, occurs when a firm revalues assets and liabilities based on an exit price (FASB 157). Advocates contend that fair value provides valuable and timely information to financial statement users by increasing transparency, aiding in assessing firm value. In contrast, opponents argue that fair value is transitory because once the asset or liability is traded, the related accounting entries are reversed. Thus, fair value may provide misleading and unreliable information. Further, Level 3 fair value assets and liabilities have no observable inputs and are valued by managers' assumptions, making the fair value subjective (Zyla, 2013).

Then valuation techniques are used to determine the fair value of assets and liabilities. The fair value standards describe three main approaches to measuring the fair value of assets and liabilities: the market approach, the income approach, and the cost approach. According to IFRS 13, the objective of using a valuation technique is to estimate the price at which an orderly transaction to sell the asset or transfer the liability would take place between market participants at the measurement date (Cristina-Aurora, Bunea-Bonta, 2013). The valuation techniques used to measure fair value of an item should be consistently applied, and a modification in a valuation technique or its application is permitted if it yields a measurement that is equally or more representative of the fair value under the circumstances. The inputs used in valuation techniques should primarily utilize relevant observable inputs, and the use of unobservable inputs should be minimized. These inputs must align with the characteristics of the item being measured, which market participants would consider in a transaction for that item. If no quoted price is accessible, adjustments to the valuation technique might be required to mirror the attributes of the item being measured.

According to Yong, a fair value estimate that does not take into account all factors that market participants would consider in pricing the asset or liability does not represent a fair estimate of a current transaction price on the measurement date (Yong, 2013).

In addition, Dunbolt and Rees (2008) examine fair value relevance of firms specializing in real estate and investment trusts. This research compares fair value and historical accounting information, finding that when balance sheet values are unambiguous, fair

** School of Economics and Law, Tra Vinh University, Viet Nam - PhD student at Academy of Finance;*
Corresponding author: email - htkhuong@tvu.edu.vn

value provides more relevant information than historic accounting practices. In summary, although fair value accounting creates opportunities to distort information, prior research provides evidence that the fair valuation of assets and liabilities has explanatory power for decision-making purposes. Therefore, fair value accounting can provide relevant information to users when measured with the most appropriate valuation techniques.

While there were various International Accounting Standards (IASs) and International Financial Reporting Standards (IFRSs) that were dispersed and dealt in part with fair value measurement (e.g. IAS 39/IFRS 9 on financial assets and financial liabilities; IAS 41 on Agriculture), IFRS 13 was issued to extensively deal with fair value measurement (He et al., 2020). It replaces the inconsistent guidelines found in various IFRSs with a single source of guidance on the measurement of fair value. This study concentrates on the fair value measurement concept, measurement, and valuation techniques used in fair value accounting.

2. Definition of fair value

In May 2011 as part of the convergence process involving IFRS and U.S. GAAP, the IASB issued IFRS 13 *Fair Value Measurement* based on SFAS 157 *Fair Value Measurement*. Notably, IFRS 13 (and SFAS 157) does not deal with whether fair value measurements should be used or not (Kolev, 2009). Instead, to systematically define "fair value" and regulate the determination of fair values, IFRS 13 is applicable where an individual standard already requires or permits the use of fair value measurements and it replaces the requirements previously prescribed in these standards. Therefore, under the IFRS regime, the definition of fair value and the determination of fair value are prescribed under IFRS 13, whereas the applications of fair value measurements are required in various existing IFRS standards.

Under IFRS, there have been two definitions put forward for fair value. Before the issuance of IFRS 13, the following definition of fair value was used for a long time by the IASC/IASB in its standards referring to fair value *'Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction'* (IASC, 1988).

Depending on the context, different definitions have historically been adduced for fair value. The International Accounting Standards Board (IASB) definition as contained in IFRS 13 in 2011, IFRS and U.S. GAAP converged on a common definition of fair value:

'Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date' (IASB, 2011; FASB, 2011)

The two definitions have much in common and highlight the major characteristics of fair value. First, fair value represents a current value at the measurement date. Unlike historical costs, which are always determined based on real past transactions, fair values can be determined based on hypothetical transactions that might happen in an idealized market (Yang, 2019). Second, unlike other current values, such as net realizable value or value in use, which are entity-specific value concepts, fair value should be a non-entity-specific current value. That is, Fair values should not reflect competitive advantages or economic opportunities available to a particular reporting entity. This means that when determining the fair value of an asset or liability, the valuation should not take into account any advantages or opportunities that are unique to the reporting entity, such as management skills or information advantages (Yang, 2019; Deloite, IFRS 13). Instead, the fair value should be based on the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date (Deloitte, IFRS 13).

The definition of fair value provided by IFRS 13 removed some ambiguities contained in the old version. A major criticism directed at the original definition is that it did not specify whether fair value is an entry value or an exit value which may cause ambiguities in situations where the two are not equal (Whittington, 2015). IFRS 13 clarifies the definition of fair value from two aspects. First, it substitutes the term 'amount' with the term 'price' to make it clear that 'the amount' does not include transaction costs. Second, the references to 'received to sell an asset' and 'paid to transfer a liability' suggest that fair value represents an exit value, rather than an entry value such as current cost or replacement cost (Deloitte, IFRS 13). This means that fair value is a market-based measurement and not an entity-specific measurement. The fair value measurement approach should use observable inputs and minimize the use of unobservable inputs. The fair value measurement framework described in IFRS 13 applies to both initial and subsequent measurements if fair value is required or permitted by other IFRS. When measuring fair value, an entity uses the assumptions that market participants would use when pricing the asset or the liability under current market conditions, including assumptions about risk.

3. Valuation methods and level of inputs in fair value measurement

To increase consistency and comparability in reporting fair value measurements for different types of assets, liabilities, or equity instruments, IFRS 13 establishes a fair value hierarchy that unifies the measurement and disclosure requirements for fair values prescribed by various existing IFRS standards. Based on the inputs employed to determine fair values, fair value measurements are categorized into three levels in the fair value hierarchy (Table 1).

Table 1: Summary of inputs employed to determine fair values in the fair value hierarchy

Level	Characteristics of Inputs	Example of Inputs
Level 1	Observable inputs; Quoted prices (unadjusted) in an active market for identical assets or liabilities that the entity can access at the measurement date	Listed equity securities traded in active, deep markets.
Level 2	Observable inputs; Quoted prices for similar assets or liabilities in the active market; Quoted prices for identical or similar assets or liabilities in markets that are not active; Inputs other than quoted prices that are observable for the asset or liabilities	A dealer quote for a non-liquid security; Interest rates and yield curves are observable at commonly quoted intervals.
Level 3	Unobservable inputs for the asset or liability.	Management assumptions that cannot be corroborated with observable market data; Vendor-provided prices, not corroborated by market transactions.

Source: Yang, F. (2019)

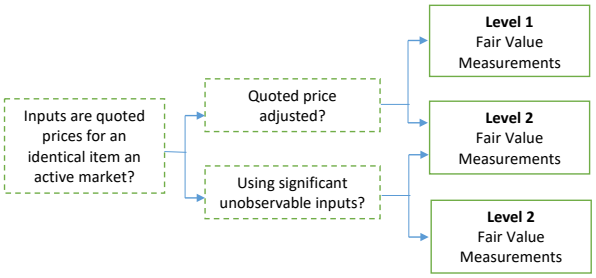
Fair value Level 1 inputs (market-based) reflect active markets' quoted prices for identical assets or liabilities that the firm can obtain at the measurement date. A quoted market price is considered the most reliable evidence of fair value offered by an active market and is used without any adjustments to measure fair values of assets or liabilities (IASB, 2011).

Unlike fair value Level 1 inputs, Level 2 fair value measurements are determined based on 'inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly' (IASB, 2011; Oyewo, 2021).

Finally, fair value Level 3 inputs (mark-to-model) are usually risky and complex. Level 3 fair value inputs depend on unobservable inputs to measure the fair values of assets and liabilities (IASB, 2011; IAS Plus, 2020). These unobservable inputs are often relevant due to the non-availability of the relevant observable inputs, especially in cases where active markets are lacking (Song, 2015).

The fair value hierarchy gives the highest priority to directly observable market prices, i.e., Level 1 inputs, and the lowest priority to inputs based on unobservable assumptions, i.e., Level 3 inputs. Figure 2 outlines the process used to determine the level of fair value measurements in the fair value hierarchy. Where applicable, Level 1 inputs acquired from active markets provide the best estimate of fair value. Fair values measured based on Level 1 inputs are also referred to in the accounting literature as mark-to-market fair values (Song et al., 2010). These inputs are considered the most reliable evidence of fair value and are used without adjustment to measure fair value whenever available. According to IFRS 13, Level 1 inputs are available for many financial assets and financial liabilities (IASB, 2011; Oyewo, 2021).

Figure 1: Decision process used to determine the level of fair value measurements



Source: Yang, F. (2019)

Level 2 inputs comprise other observable inputs not included within 'Level 1' of the fair value hierarchy. These inputs are other than quoted prices included within Level 1 that are directly or indirectly observable for an asset or liability. This includes quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, and inputs other than quoted prices that are observable for the asset or liability. Level 2 input is used when there is a market for a product with some similarities and is, therefore, used as a basis for comparison (Cardao-Pito & Barros, 2016).

In situations where market prices are either unavailable or unqualified as Level 1 inputs, Level 2 or Level 3 inputs and valuation techniques should be employed to determine fair value. Fair values generated based on Level 2 and Level 3 inputs are also referred to as mark-to-model fair values (Magnan et al., 2015; Song et al., 2010). Level 3 fair value estimates differ from Level 1 and 2 in that the inputs used are unobservable and derived from managers' assumptions. Further, Level 3 fair values are unique in that there is no market or comparable asset or liability to determine a value (Kieso et al., 2010; Zyla, 2013). Therefore, managers' discretion is used to determine the value of these assets and liabilities. Any discretion used to arrive at Level 3

fair values is recognized in the balance sheet, while in the income statement or the other comprehensive income statement to reflect the economic value (Penman, 2007).

In practice, a specific valuation technique is selected based on the available inputs and the nature of the assets or liabilities to be measured. However, in the case of an inefficient or illiquid market (i.e., fair value Level 2 and Level 3 inputs), firms are required to use appropriate valuation techniques to provide accurate assumptions regarding fair values (Freeman et al., 2017).

IFRS 13 also provides three main valuation techniques that can be used to estimate fair values using Level 2 and Level 3 inputs (IASB, 2011): the market approach (reference to market prices of other comparable assets, such as matrix pricing), the cost approach (current replacement cost), and the income approach (converting future amounts to a current amount, such as present value techniques).

The market approach is a valuation method that uses prices and other relevant information from market transactions involving comparable or identical assets and liabilities. The cost approach reflects the amount that would be required currently to replace the service capacity of an asset (Deloitte, 2012). The income approach converts future amounts (i.e., cash flows or income and expenses) to a single current amount. In addition to these three valuation methods, the standard permits the use of fair value estimates computed by experts, provided the valuation is arrived at in compliance with IFRS 13 guidance.

4. Valuation techniques

According to IFRS 13, the objective of using a valuation technique is to estimate the price at which an orderly transaction to sell the asset or to transfer the liability would take place between market participants at the measurement date under current market conditions (IFRS 13). Some general principles need to be applied when selecting the appropriate valuation technique. According to Cristina-Aurora and Bunea-Bonta (2013), the valuation technique should be:

+ Appropriate, depending on the circumstances;

+ A technique for which sufficient data is available;

+ Maximise the use of relevant observable inputs and minimize the use of unobservable inputs;

+ Consistent use of a valuation technique, according to the Standard.

A valuation technique has the following principal characteristics:

+ It is commonly used by market participants and uses inputs that market participants would usually consider;

+ It is consistent with accepted economic methodologies and techniques;

+ It relies as little as possible on entity-specific factors;

+ It is applied consistently; and

+ It has to be validated against actual market transactions.

The Standard notes that there are three widely used valuation techniques: the market approach, the cost approach and the income approach (Table no.2). These techniques are consistent with the going-concern assumption and they may be used for fair value measurement of entities or specialized assets and liabilities.

Table 2: Valuation techniques used in fair value measurement

The market approach	Is based on market transactions involving identical or similar assets or liabilities
The cost approach	Is based on the amount required to replace the service capacity of an asset (frequently referred to as current replacement cost)
The income approach	Is based on future amounts that are converted (discounted) to a single present amount

Source: Cristina-Aurora, Bunea-Bonta (2013) and ifrscommunity.com

There are three commonly used valuation techniques to measure fair values: the market approach, the cost approach, and the income approach (IAS 39). Regarding the market approach, this method uses prices and other relevant information from market transactions, including matrix pricing. Matrix pricing is defined as a mathematical technique mainly used to compute the relationship of debt securities with other benchmark quoted securities, such as debt securities. It relies on the securities' relationship to other benchmark quoted securities, considering features like coupon, maturity, or credit rating, rather than relying exclusively on quoted prices for the specific securities (Barlev and Haddad, 2004). The method derives an estimated price of an instrument using transaction prices and other relevant market information for benchmark instruments with similar features.

The income approach converts future amounts (i.e., cash flows, expenses, and income) to given present discounted amounts. Thus, fair values are determined based on the values generated by current market expectations regarding those future amounts (IFRS foundation, 2018). These valuation models include current value methods, option pricing models, which combine current value techniques and indicate both intrinsic and time values of an option, and the multi-period excess earnings method, considered the best measure for the fair value of some intangible assets (Alharasis, 2021).

Finally, the cost approach reflects the value that would be required presently to substitute the residual capacity of an asset, known as the current replacement cost. From the seller's perspective, the price gained for the asset depends on the cost to a buyer to purchase or construct an identical asset of comparable utility, customized for obsolescence (Alharasis, 2021). The current replacement cost is an approach that can measure the fair value of fixed assets by using an in-use valuation premise due to the lack of the possibility of the market participant paying more for an asset than the value for which it could exchange the service capacity of that asset (Haswell and Evans, 2018).

Valuation techniques used to measure fair values should be consistently employed to ensure consistency and comparability in reporting fair value measurements (IFRS 13). However, changing valuation techniques is possible where this change would result in a measurement that is more representative of the fair values in those circumstances (Penman, 2007; Alharasis, 2021).

5. Conclusion

This research has provided a deeper understanding of the measurement and valuation techniques used in fair value accounting. Fair value accounting has become an integral part of the international accounting framework and is widely employed in diverse situations, from valuing assets to assessing complex financial instruments. The study has demonstrated that measuring and valuing in fair value accounting not only requires a grasp of complex techniques but also demands a profound comprehension of context and judgment. It has also underscored the crucial role of reliable information sources and careful assessment in determining the fair value of assets and liabilities.

IFRS 13 Fair Value Measurement seeks to increase consistency and comparability in fair value measurements and related disclosures through a 'fair value hierarchy'. The hierarchy categorizes the inputs used in valuation techniques into three levels, with the highest priority given to (unadjusted) quoted prices in active markets for identical assets or liabilities and the lowest priority given to unobservable inputs. Valuation involves significant judgment and is based on several valuation techniques. Different valuation techniques may provide different results because of the inputs used and the adjustments to those inputs. Arriving at accurate, defensible values for businesses and/or business assets is an arduous and complicated process requiring the skills of experienced accounting professionals. An accounting expert has the knowledge and experience needed to choose the best valuation method for specific needs and calculate a fair and accurate value.

Overall, fair value accounting requires a deep understanding of valuation techniques and accounting standards, as well as careful consideration of the specific assets and liabilities being measured. Companies should be aware of the complexities and challenges involved in fair value accounting and take steps to ensure accurate and reliable reporting, contributing to a sustainable and trustworthy business environment.

References:

Alharasis, E. E. (2021), The Impact of Fair Value Disclosure on Audit Fees of Jordanian Listed firms, the PhD thesis of Philosophy, Victoria University, Melbourne, Australia.

Barlev, B. & Haddad, J. R. (2004), "TRACKS: Dual accounting and the Enron control crisis", Journal of Accounting, Auditing & Finance, 19(3):343-359.

Cardao-Pito, T. & Barros, J. (2016), "The application of "fair value" accounting standards to the income statements of companies listed in the Portuguese Stock Index-20 (PSI-20)", Revista Brasileira De Gestão De Negócios, 18(59):67-86.

Cristina-Aurora & Bunea-Bonta (2013), "Valuation techniques used in fair value measurement", Management Strategies Journal, vol. 22, issue Special: 97-104.

Danbolt, J. & Rees, W. (2008), "An experiment in fair value accounting: UK investment vehicles", European Accounting Review, 17(2): 271-303.

Deloitte (2012), iGAAP 2012: A guide to IFRS reporting, Volume A, Part 1. (5th Ed.), London, Edinburg: Lexis-Nexis.

Ernst & Young (2013), "Fair value implications for the real estate sector and example disclosures for real estate entities", available at: http://www.ey.com/Publication/vwLUAssets/ Applying IFRS in Real Estate/$FILE/ Ap plying RealEstate.pdf (Accessed on September 2023).

FASB (2020), Summary of statement No. 157: Fair value measurements SFAS 157, available at: https://www.fasb.org/page/PageContent?pageId=/reference-library/superseded-standards/summary-of-statement-no-157.html&bcpath=tff (Accessed on September 2023).

Financial Accounting Standards Board (2011), Accounting Standards Codification 820 Fair Value Measurement, FASB 2011.

Financial Accounting Standards Board (2010), Fair Value Measurements. Statement of Financial Accounting Standards No. 157, Stanford CT: FASB 2010.

Freeman, W. Wells, P. & Wyatt, A. (2017), "Measurement Model or Asset Type: Evidence from an Evaluation of the Relevance of Financial Assets", Abacus, 53(2): 180-210.

Haswell, S. & Evans, E. (2018), "Enron, fair value accounting, and financial crises: a concise history", Accounting, Auditing & Accountability Journal, 31(1).

He, L., Wright, S & Evans, E. (2020), "The impact of managerial discretion on fair value information in the Australian agricultural sector", Accounting & Finance, 61: 1897–1930.

International Accounting Standards Committee (1988). Exposure Draft E40 Financial Instruments, London, UK: IASC.

International Accounting Standards Board (2011), IFRS 13 Fair Value Measurement, London, UK: IASB.

IAS Plus, IAS 39 - Financial Instruments: Recognition and Measurement/History of IAS 39, Deloitte Global Services Limited, Available at: https://www.iasplus.com/en/standards/ias/ias39 (Accessed on September 2023).

IAS Plus, IFRS 13 - Fair Value Measurement, Deloitte Global Services Limited, available at: https://www.iasplus.com/en/standards/ifrs/ifrs13 (Accessed on September 2023).

IFRS® foundation (2018), Use of IFRS Standards around the world, available at: https://cdn.ifrs.org/-/media/feature/around-the-world/adoption/use-of-ifrs-around-the-world-overview-sept-2018.pdf?la=en (Accessed on September 2023).

IFRS 13, Fair Value Measurement, Available at: https://www.ifrs.org/content/dam/ifrs/publications/pdfstandards/english/2022/issued/part-a/ifrs-13-fair-value-measurement.pdf?bypass=on (Accessed on September 2023).

Kolev, K. (2009), Do investors perceive mark-to-model as marking-to-myth? Early evidence from FAS No. 157 disclosure, Working paper, New York University.

Kieso, D. E., Weygandt, J. J. & Warfield, T. D. (2010), Intermediate accounting: IFRS edition, vol. 2, John Wiley & Sons.

Magnan, M., Menini, A., & Parbonetti, A. (2015), "Fair value accounting: information or confusion for financial markets?", Review of Accounting Studies, 20(1), 559-591.

Marek Muc FCCA, Valuation Techniques (IFRS 13 Fair Value Measurement), Available at: https://ifrscommunity.com/knowledge-base/valuation-techniques-fair-value/ (Accessed on September 2023).

Oyewo, B. (2021), "Diffusion of fair value measurement (IFRS 13): Perception of Auditors", Contaduría y Administración, 66(2):1-33.

Penman, S.H. (2007), "Financial reporting quality: is fair value a plus or a minus?", Accounting and Business Research, 37(sup1):33-44.

Song, X. (2015), "Value relevance of fair values-Empirical evidence of the impact of market volatility", Accounting Perspectives, 14(2): 91-116.

Song, C. J., Thomas, W. B., & Yi, H. (2010), "Value relevance of FAS No.157 fair value hierarchy information and the impact of corporate governance mechanisms", The Accounting Review, 85(4): 1375-1410.

Whittington, G. (2015), Fair value and IFRS. The Routledge Companion to Financial Accounting Theory: Routledge; 217 – 231.

Yang, F. (2019), The application of fair value accounting to investment property, Doctoral thesis UNSW Business School.

Yong, K. O., "Fair Value Accounting: SFAS 157 and IAS 39", available at: https://www.readkong.com/page/fair-value-accounting-sfas-157-and-ias-39-7894693 (Accessed on September 2023).

Zyla, L. M. (2013), Fair Value Measurement: Practical Guidance and Implementation, Hoboken, New Jersey: John Wiley & Sons, Inc.

FACTORS DRIVING VIETNAMESE INTENTION TO USE HEALTHCARE APPS

PhD. To Anh Tho*

Abstract: ***The robust development of information technology applications has brought significant benefits across various sectors, ranging from manufacturing and business to education and healthcare. Particularly noteworthy since the COVID-19 pandemic, mobile healthcare applications have seen widespread deployment. This research aims to analyze the factors influencing intention to use healthcare apps in Ho Chi Minh City. These factors include perceived usefulness, ease of use, health consciousness, social influence, and online reviews. An experimental study was conducted using multiple regression analysis with SPSS 22.0 on a sample of 257 respondents. The study results indicate that online reviews and ease of use positively impact the intention to use mobile healthcare apps. These findings provide valuable managerial implications for technology developers and healthcare organizations to implement new applications and explore untapped markets with significant potential in the future.***

• Keywords: *healthcare, apps, intention.*

Date of receipt: 26th January, 2024

Date of delivery revision: 29th January, 2024

Date of receipt revision: 29th February, 2024

Date of approval: 25th March, 2024

1. Introduction

The rapid development of information technology in the modern world has significantly influenced consumer behavior, especially concerning their daily utilization of mobile devices. This impact has been further intensified during the Covid-19 pandemic. Moreover, the pandemic's effects have fostered increased awareness and concern among individuals regarding their health status. The widespread adoption of mobile devices and the user-friendly nature of mobile applications have also accelerated the growth of healthcare applications and services. Presently, many healthcare applications have been developed to cater to diverse health monitoring needs, encompassing the management of chronic illnesses, promotion of a healthy lifestyle, and even self-diagnosis. For the purpose of this study, "Healthcare apps" pertain to patient-centric software aimed at enabling self-diagnosis and health maintenance.

As reported by Mordor Intelligence (2021), the global mobile health market was valued at USD 63,543.75 million in 2021 and is projected to reach USD 236,214.86 million by 2027, with an impressive Compound Annual Growth Rate (CAGR) of 24.57% during the forecast period (2022-2027). The Covid-19 pandemic has the potential to positively influence the overall market dynamics. In response to the pandemic's challenges, mobile health solutions have emerged as a critical lifeline, aiming to mitigate the risk of additional infections and safeguard frontline healthcare workers and patients. These solutions, leveraging smartphones and remote monitoring, have become indispensable for providing consultation services. This ongoing trend is expected to fuel the widespread adoption of digital solutions, particularly those integrating remote care components in the foreseeable future.

In the Vietnamese market, a report by Vietnam Digital (2023) indicates that as of the beginning of 2023, Vietnam boasts 77.93 million Internet users, comprising 79.1% of the total population. This reflects a notable increase of 5.3 million users (+7.3%) compared to the figures recorded at the beginning of 2022. Furthermore, the prevalence of mobile devices has witnessed steady growth, with the number of devices per individual continuing to rise in 2023 compared to the previous year. Notably, the development of robust technology infrastructure plays a pivotal role in facilitating the advancement of healthcare applications in the country. Moreover, the Ministry of Health took a significant step towards promoting digital health platforms through the issuance of Decision No. 2955/QD-BYT on October 28, 2022. This decision outlines a comprehensive plan aimed at fostering the development and utilization of digital health platforms to effectively implement

** University of Finance - Marketing, Ho Chi Minh City; email: totho@ufm.edu.vn*

the National Digital Transformation Program until 2025, with a vision extending to 2030. Such strategic initiatives are poised to revolutionize healthcare delivery and access to services in Vietnam. In practice, the development of new applications is still limited, and user engagement with healthcare applications is not yet high. Therefore, this research is conducted to identify the factors influencing consumer intentions to use mobile health applications, thereby providing managerial implications for application developers and healthcare institutions to enhance the benefits that this technology brings to the community.

2. Literature Review and hypothesis development

2.1. Grounded theories

The Technology Acceptance Model (TAM), originally proposed by Davis et al. (1989), has been widely employed by researchers to elucidate consumers' acceptance of information technology and to establish the significance of perceived usefulness and perceived usability as pivotal factors in technology acceptance. It is considered one of the most renowned models for predicting the acceptance of technical advancements across diverse contexts (Bilgihan, 2013). In an effort to address the perceived limitations of TAM, Mohamed et al. (2011) conducted a pilot study to investigate and evaluate the variables that might influence the acceptability of medical informatics incorporated into mobile phones.

The Unified Theory of Acceptance and Use of Technology (UTAUT), an extended version of TAM, was developed by Venkatesh et al. (2003) to account for the broader range of factors required to comprehensively describe user intentions. UTAUT incorporates four key aspects that serve as direct antecedents of behavioral intention and behavior: (1) performance expectancy; (2) effort expectancy; (3) social influence; and (4) facilitating conditions. Additionally, control variables, such as gender, age, experience, and desire to use, were integrated to mitigate the influence of these four main factors on intention and behavior related to technology use. UTAUT is widely recognized as a robust theoretical framework for exploring continued usage behavior in the context of mobile health apps (Wu et al., 2022).

2.2. Factors affecting intention to use healthcare applications

2.2.1. Perceived usefulness (PU)

Perceived usefulness (PU) is the measure of individuals' belief in how effectively using a specific system will enhance their task accomplishment. PU has garnered significant attention in numerous studies exploring the intentions and behaviors related to using mobile healthcare applications (Nasir & Yurder, 2015; Yee et al., 2019). Empirical research consistently confirms a significant correlation between mobile phone usage intentions and perceived usefulness in the context of healthcare applications. Consumers often opt to adopt health applications with the expectation of benefiting from various advantages, such as weight loss, fitness improvement, or emotional well-being. Consequently, users' satisfaction with the app's features contributes to an increased desire to continue using it (Hanh et al., 2020).

H1: Perceived usefulness has a positive influence on the intention to use healthcare apps.

2.2.2. Perceived ease of use (PEOU)

Perceived Ease of Use (PEOU) is defined as the extent to which an individual believes that using a particular system is effortless and requires minimal time and effort (Davis, 1989). It pertains to the simplicity of using electronic systems without encountering significant challenges or time-consuming processes. In their investigation of mobile healthcare app adoption behavior, Mohamed et al. (2011) established a significant association between perceived ease of use and the intention to use. Consequently, PEOU holds paramount importance in the context of mobile health services, regardless of users' proficiency in technology (Pavlou et al., 2007).

H2: Perceived ease of use has a positive effect on the intention to use healthcare apps.

2.2.3. Health consciousness (HC)

Health consciousness refers to an individual's level of concern and consideration towards their own well-being and overall health. Greater health consciousness often leads individuals to adopt healthier habits and serves as the basis for taking proactive actions to manage and safeguard their health. In recent years, the Covid-19 pandemic has heightened people's awareness of the significance of their health (Pu et al., 2020). Consequently, individuals have become more inclined to explore techniques and practices that can aid in maintaining or improving their health and quality of life, as well as monitoring their health status (Rodgers et al., 2007). Healthcare applications have emerged as valuable tools for users to proactively manage and enhance their health, enabling them to collect

relevant health data and track changes over time. As a result, individuals who utilize healthcare apps exhibit a clearer understanding of their health status and objectives (Wu et al., 2022).

H3: Health consciousness has a positive effect on the intention to use healthcare apps.

2.2.4. Social influence (SI)

Social influence refers to the phenomenon in which the behavior of one individual serves as a guide and influence for the actions of others in their immediate social circle (Chong et al., 2012). It encompasses the degree to which people are impacted by the opinions and actions of those around them, such as family and friends. In the context of the Theory of Reasoned Action (TRA), social influence is expressed as a subjective norm, directly affecting individuals' behavioral intentions (Venkatesh et al., 2003). By observing and adopting the behavior of others, individuals can attain social recognition and increase their social value, which in turn, enhances their inclination to use health apps.

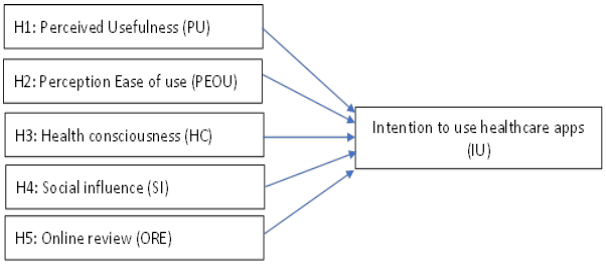
H4: Social influence has a positive impact on the intention to use mobile health apps.

2.2.5. Online review (ORE)

Online reviews are widely shared sources of information on virtual platforms that circulate globally (Filieri, 2015). The usage of Internet-based apps has significantly influenced consumer shopping behavior, granting customers the ability to share their opinions with a vast online community about the services and products they have utilized. Prospective customers show keen interest in online consumer reviews and carefully consider feedback from previous users. Linked reviews, in particular, have witnessed a surge in popularity and play a crucial role as valuable knowledge resources for customers in their search for or selection of products and services (Khoa & Ngoc, 2017). Research has established a significant correlation between online reviews, user experience, and users' intention to use. Factors such as amusement and usability contribute to users' contentment with mHealth apps, particularly when they perceive internet evaluations as valuable, beneficial, comprehensive, trustworthy, and up-to-date (Elwalda et al., 2016; Alalwan, 2020). It is common for people to read internet reviews that greatly influence their purchasing decisions (Filieri, 2015).

H5: Online reviews have a positive impact on the intention to use mobile healthcare apps.

Figure 1. The proposed research model



3. Methodology

The measurement items were primarily sourced from Octavius and Antonio (2021), Davis (1989), and Wu et al. (2022). Participants utilized a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) to indicate their level of agreement with each item.

An online questionnaire survey was conducted to gather primary data from consumers' intentions to use a healthcare app in Ho Chi Minh City, Vietnam. Before conducting an official survey, a group of 50 respondents is interviewed for language and question ambiguity, resulting in minor adjustments being made. The survey received 270 responses, out of which 257 were deemed appropriate for analysis.

The authors performed a quantitative analysis using SPSS 22.0 to assess the influence of factors on the utilization of healthcare apps. To evaluate the reliability of the factors, Cronbach's Alpha was employed with a threshold of 0.70 as the cutoff point. Furthermore, exploratory factor analysis (EFA) was utilized to identify and eliminate inappropriate variables. Finally, a regression model was employed to examine the impact of the aforementioned factors.

4. Results

4.1. Reliability test

The reliability of the factors was evaluated using Cronbach's Alpha, with a minimum threshold of 0.70, and the corrected item-total correlation, which should be equal to or greater than 0.3. As shown in Table 1, all factors demonstrated Cronbach's Alpha values exceeding 0.7, and all the corrected item-total correlations were greater than 0.3, providing evidence of the reliability of the factors for subsequent analysis.

Table 1. Cronbach's alpha

Factors	Corrected item - Total correlation	Cronbach's Alpha	Number of items
Perceived Usefulness	0.558 - 0.569	0.738	3
Perceived Ease of Use	0.591 - 0.695	0.804	4
Health Consciousness	0.477 - 0.680	0.784	4

Factors	Corrected item - Total correlation	Cronbach's Alpha	Number of items
Social Influence	0.566 - 0.704	0.808	4
Online Review	0.613 - 0.708	0.842	5
Intention to Use	0.590 - 0.664	0.775	3

4.2. Exploratory factor analysis

Exploratory Factor Analysis (EFA) was employed to examine the correlation among variables across all groups of factors and to eliminate insignificant variables. The Eigenvalue criterion exceeded 1, and the cumulative variance of 65.293% surpassed 50%, indicating that the variation in the 23 observed variables could be effectively explained by six factors. The Kaiser-Meyer-Olkin (KMO) coefficient for the study was 0.826, which is greater than the recommended threshold of 0.5, affirming the suitability of factor analysis. The statistical significance of Bartlett's test (Sig = 0.000 < 0.05) indicated a significant relationship between the observed variables and the underlying factors. Furthermore, Table 2 shows that factor loadings exceeding 0.5 demonstrated practical significance.

Table 2. Exploratory factor analysis

	Component					
	1	2	3	4	5	6
PU1					.778	
PU2					.801	
PU3					.800	
PEOU1		.768				
PEOU2		.835				
PEOU3		.679				
PEOU4		.780				
HC1				.587		
HC2				.713		
HC3				.814		
HC4				.830		
SI1			.756			
SI2			.823			
SI3			.847			
SI4			.744			
ORE1	.707					
ORE2	.743					
ORE3	.815					
ORE4	.763					
ORE5	.714					
IU1						.580
IU2						.853
IU3						.795

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

4.3. Pearson correlations

Pearson correlation analysis was utilized to assess the relationship between two factors and to identify any potential multicollinearity issues arising from strong correlations among the independent variables. As presented in Table 3, the correlation coefficients of PU, PEOU, and ORE with IU are significantly positive. The findings indicate a statistically significant and positive relationship between the independent factors and the three dependent factors. However, the correlation coefficient of HC is significantly negative and the correlation coefficient of SI is insignificant. This finding may predict that there is no impact of the two factors on the dependent factor. Besides, the absolute value of the Pearson correlation coefficient being less than 0.8 suggests a minimal likelihood of collinearity issues.

Table 3. Correlations

	PU	PEOU	HC	SI	ORE	IU
PU	1					
PEOU	.085	1				
HC	-.106	-.402**	1			
SI	.038	.062	-.146*	1		
ORE	.294**	.296**	-.371**	.053	1	
IU	.217**	.298**	-.311**	.075	.520**	1

***. Correlation is significant at the 0.01 level (2-tailed).*
**. Correlation is significant at the 0.05 level (2-tailed).*

4.4. Regression

Table 4. Multiple regression results

Coefficients[a]								
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.722	.469		3.671	.000		
	PU	.065	.052	.069	1.262	.208	.913	1.095
	PEOU	.131	.060	.128	2.193	.029	.813	1.230
	HC	-.101	.068	-.089	-1.469	.143	.756	1.323
	SI	.028	.051	.029	.549	.583	.978	1.022
	ORE	.399	.056	.427	7.145	.000	.774	1.291

a. Dependent Variable: IU

The study performed regression analysis to evaluate the significance of the five factors. The result indicated that the adjusted R-squared was 0.305, and the F-test in ANOVA had a Sig level = 0.000. This suggests that the regression model was suitable, and the five factors could account for 30.8% of the variation in the dependent variable.

In Table 4, the multiple regression analysis reveals that Perceived Ease of Use (PEOU) and Online Review Effectiveness (ORE) are statistically significant, whereas the other factors show no significant impact. This implies that the ease of use of healthcare apps plays a crucial role in influencing user intentions. Users generally prefer applications that are user-friendly and straightforward to learn and navigate. Therefore, healthcare app developers should prioritize ensuring

clear and easily understandable interactions for users' seamless experience with the application.

However, perceived usefulness does not affect the intention to use. This can be explained because smartphone users have not yet appreciated the usefulness of healthcare applications. In particular, when comparing them with other apps within the limited memory of the phone, healthcare apps are considered less important.

Next, social influence and health consciousness also have no impact on the intention. However, most respondents show that they are relatively concerned about their health with an average score of about 3.37 out of 5, and that the impact of loved ones on their thoughts and actions also reached 3.35 out of 5. Besides, the regression coefficient of HC is negative. These results prove that healthcare apps in Vietnam are still not considered a tool for necessary healthcare and monitoring. This is in contrast to the research results of Western countries when medical applications are carefully invested and researched before being marketed.

However, the influence of online reviews has an impact on the intention to use. This shows the power of social networks in shaping consumer psychology. This is also an opportunity for application developers to push for opinions and promote more strongly for their applications.

5. Conclusion

With a market full of potential in the future, the development and user attraction of mobile health applications requires significant attention. In the context of the Covid-19 pandemic, mobile health applications have proven to be an effective solution in reducing the burden of health monitoring activities at healthcare facilities. Based on research findings, we propose several managerial implications for application developers and healthcare institutions.

Online reviews are the most positively influential factor on the intention to use mobile health care applications. Users are attentive to evaluation comments from the user community on social media platforms. The information they receive serves as the basis for their decision to use the applications. This highlights the need for application developers and healthcare institutions to focus on communication, particularly on social media platforms. The information provided must ensure reliability, relevance to users' needs, clarity, and comprehensiveness. Additionally, developers should establish mechanisms for users to share their feedback on application characteristics to build trust and attract new users.

The next positively influential factor on the intention to use is the ease of use. Embracing new technology poses a barrier, especially for older users. Therefore, application developers need to pay attention when designing application features. The applications should be easy for users to learn how to use; interact clearly and simply with healthcare applications; and have interfaces that are clear and understandable for healthcare applications.

References:

Alalwan, A.A. (2020). Mobile food ordering apps: An empirical study of the factors affecting customer e-satisfaction and continued intention to reuse. International Journal of Information Management, 50(1), pp.28-44. doi:10.1016/j.ijinfomgt.2019.04.008.

Bilgihan, A. (2013). Smartphone users' intention to use health applications. www.academia.edu. [online] Available at: https://www.academia.edu/6378163/Smartphone_users_intention_to_use_health_applications [Accessed 16 Oct. 2022].

Chong, A.Y.-L., Chan, F.T.S. and Ooi, K.-B. (2012). Predicting consumer decisions to adopt mobile commerce: Cross country empirical examination between China and Malaysia. Decision Support Systems, [online] 53(1), pp.34-43. doi:10.1016/j.dss.2011.12.001.

Elwalda, A., Lü, K. and Ali, M. (2016). Perceived derived attributes of online customer reviews. Computers in Human Behavior, 56, pp.306-319. doi:10.1016/j.chb.2015.11.051.

Filieri, R. (2015). What makes online reviews helpful? A diagnosticity-adoption framework to explain informational and normative influences in e-WOM. Journal of Business Research, 68(6), pp.1261-1270. doi:10.1016/j.jbusres.2014.11.006.

Hanh, N. T. H., Hung, D. M., Trinh, V. D. P., Vy, C. T. T., & La Thi Nhu, Y. (2019). Factors affecting the intention to use online shopping apps in Ho Chi Minh City. VNUHCM Journal of Economics, Business and Law, 3(4), 390-401. doi:10.32508/stdjelm.v3i4.582.

Khoa, D. L., & Ngoc, N. T. H. (2017). Ảnh hưởng của đánh giá trực tuyến đến quyết định lựa chọn khách sạn của khách du lịch khi đến Huế. Hue University Journal of Science: Economics and Development, 126(5D), 41-51.

Mohamed, A.H.H.M., Tawfik, H., Al-Jumeily, D. and Norton, L. (2011). MoHTAM: A Technology Acceptance Model for Mobile Health Applications. 2011 Developments in E-systems Engineering. doi:10.1109/dese.2011.79.

Nasir, S. and Yurder, Y. (2015). Consumers' and Physicians' Perceptions about High Tech Wearable Health Products. Procedia - Social and Behavioral Sciences, [online] 195, pp.1261-1267. doi:10.1016/j.sbspro.2015.06.279.

Octavius, G. S., & Antonio, F. (2021). Antecedents of intention to adopt mobile health (mHealth) application and its impact on intention to recommend: An evidence from Indonesian customers. International journal of telemedicine and applications, 2021.

Pavlou, P.A., Lie, T. and Dimoka, A. (2007). What Drives Mobile Commerce? An Antecedent Model of Mobile Commerce Adoption. SSRN Electronic Journal. doi:10.2139/ssrn.2380712.

Pu, B., Zhang, L., Tang, Z. and Qiu, Y. (2020). The Relationship between Health Consciousness and Home-Based Exercise in China during the COVID-19 Pandemic. International Journal of Environmental Research and Public Health, 17(16), p.5693. doi:10.3390/ijerph17165693.

Rodgers, S., Chen, Q., Duffy, M. and Fleming, K. (2007). Media Usage as Health Segmentation Variables. Journal of Health Communication, 12(2), pp.105-119. doi:10.1080/10810730601150064.

Venkatesh, V., Morris, M.G., Davis, G.B. and Davis, F.D. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), pp.425-478. doi:10.2307/30036540.

Wu, P., Zhang, R., Zhu, X. and Liu, M. (2022). Factors Influencing Continued Usage Behavior on Mobile Health Applications. Healthcare, 10(2), p.208. doi:10.3390/healthcare10020208.

Yee, T.S., Seong, L.C. and Chin, W.S. (2019). Patient's Intention to Use Mobile Health App. Journal of Management Research, 11(3), p.18. doi:10.5296/jmr.v11i3.14776.

Zhang, X., Han, X., Dang, Y., Meng, F., Guo, X. and Lin, J. (2016). User acceptance of mobile health services from users' perspectives: The role of self-efficacy and response-efficacy in technology acceptance. Informatics for Health and Social Care, 42(2), pp.194-206. doi:10.1080/17538157.2016.1200053.

Acknowledgment

The author expresses his gratitude to Ms. Dang Minh Anh for her valuable insights and assistance in this research.

THE IMPACT OF CORPORATE CARBON TRADING ON FIRM PERFORMANCE: EVIDENCE FROM CLEAN DEVELOPMENT MECHANISM IN VIETNAM

PhD. Nguyen Thi Hoa Hong* - Nguyen Le Hanh Ngan* - Vu Khanh Linh* - Ha Phuong Thao*

Abstract: ***This paper investigates the impact of corporate carbon trading on the performance of Vietnamese listed companies from 2010 to 2022, with a specific focus on the Clean Development Mechanism (CDM) in Vietnam. The regression results indicate a positive association between corporate carbon trading and firm performance. This suggests that companies engaging in carbon trading activities experience notable improvements in profitability. These results offer valuable insights for policymakers and businesses, underlining the significance of integrating carbon trading into sustainability strategies to capitalize on financial advantages and facilitate the transition towards a low-carbon economy.***

• Keywords: *carbon trading, Clean Development Mechanism (CDM), firm performance.*

Date of receipt: 26th January, 2024

Date of delivery revision: 29th January, 2024

Date of receipt revision: 29th February, 2024

Date of approval: 25th March, 2024

1. Introduction

The impact of climate change is evident in every facet of our lives worldwide. Businesses suffer from climate change in various ways, both through physical and transition risks. Physically, extreme weather events such as storms and floods can cause damage to infrastructure and supply chains, leading to business closures. Climate change also affects the availability of resources on which businesses rely, resulting in disruptions or even closures. Furthermore, as governments worldwide take action to mitigate climate change, costs and regulations for corporations are being and will be introduced. Companies that neglect this environmental aspect and continue emitting heavily will not only suffer a loss of market share, which demands sustainability in businesses, but also experience reputational damage for polluting, leading to the loss of customers and investors. Hence, it is essential for companies to take steps to reduce their carbon emissions. Despite some skepticism, methods and mechanisms have been introduced for firms to address this global issue. The Clean Development Mechanism (CDM) is one of the three market-based mechanisms developed by the Kyoto Protocol, intending to enable investors (in developed countries) to achieve their emission reduction goals cost-effectively and support developing countries to achieve sustainable development. CDM has experienced ups and downs, with a rise in market value in 2005 and a subsequent price decrease since 2008 for various reasons. Nevertheless, it is undeniable that CDM has achieved significant results, preventing billions of tonnes of greenhouse gases (GHG), thus avoiding at least 3.6 billion USD in negative social impacts (Maraseni & Cadman, 2015).

While Vietnam's economy has grown rapidly in terms of greenhouse gas (GHG) emissions in recent decades, the country is also highly vulnerable to climate change (Zimmer et al, 2015). Particularly, the Northern area has been experiencing extreme weather with the highest and lowest recorded temperatures in recent decades, while the Middle and Southern areas face floods. Being aware of this issue, the Vietnamese government and policymakers have introduced regulations and policies to mitigate climate change, committing to realizing Net Zero by 2050. One of the efforts made is the adoption of the carbon trading mechanism - CDM. The first CDM project in Vietnam started in 2008, indicating that the carbon trading market in Vietnam is still in its growth stage and has plenty of potential and opportunities. In this context, a question arises about whether listed companies conducting CDM projects can improve their financial performance. Therefore, we examine the impact of corporate carbon trading on firm performance in Vietnamese listed companies to provide a basis for both listed companies and regulatory authorities to develop reasonable strategies to promote carbon trading activities and firm performance.

2. Literature review and hypotheses development

The literature on the impact of corporate carbon trading on firm performance has been examined in

*** Foreign Trade University; email: hongnth@ftu.edu.vn***

previous studies, yielding mixed results. While the majority advocate for the positive impact of corporate carbon trading on firm performance, some authors suggest that this correlation is negative or varies over time and among studied subjects. Chen et al. (2022), in their study of pilot A-share listed firms in China, found that the carbon emission trading scheme promoted these firms' market-based financial performance, suggesting that investors had more confidence in them than in others. Similarly, Zhang et al. (2020) showed that carbon trading contributes to the economic gains of all industrial sectors, although the impacts vary among industrial sub-sectors. Notably, the whole industry benefits more when carbon trading is implemented over a long period. Marin et al. (2018) found that, contrary to previous predictions, the European Emission Trading Scheme (EU ETS) not only did not affect economic performance but even boosted it in relative terms. Moreover, firms that exited the EU ETS but remained on the market witnessed a significant decline in size. Additionally, Zhang and Gan (2023) strongly advocated for the positive impact of corporate carbon trading on firm performance, suggesting that participation in the carbon emission trading market boosts financial performance, with mediation and moderation effects observed. The enhancement of green innovation ability and the decrease of strategic choice variety partially mediate how carbon trading improves firm performance. Furthermore, executive background heterogeneity positively moderates the relationship between carbon trading schemes and firms' performance.

However, some existing literature suggests a negative impact of corporate carbon trading on financial performance. For instance, Ramiah et al. (2017) found that nullifying the carbon trading system had a positive impact on the stock market, benefiting Australian businesses. Wang et al. (2023) showed that the corporate emission trading policy could reduce turnover of companies' fixed assets while expanding their fixed assets investment, leading to disorderly capacity expansion, which is not a positive outcome.

Additionally, some authors found mixed results depending on the studied subjects. Zhang and Liu (2019) found that implementing carbon emission trading policy led to a drop in the financial performance of listed firms in the nonferrous metal industry but a boost in that of the power industry, with effects becoming more significant over time. The emission trading scheme also experienced a lag effect on the financial performance of firms in the chemical, paper, and aviation industries, changing from negative to positive over time. Jia (2023) suggested that the impact of carbon trading on downstream enterprises changed over time, from negative to positive overall. Notably, Peng et al. (2021) advocated that the emission trading scheme had a muted impact on returns on assets, suggesting that firms may face costs due to the ETS but also benefit from carbon trading.

Given the predominance of literature suggesting a positive correlation between corporate carbon trading and firm performance, we hypothesize that the firm performance of corporations participating in the carbon trading market in Vietnam will also be positively affected.

H1: Corporate carbon trading has a positive impact on the performance of Vietnamese listed companies

3. Research methodology

3.1. Data and sampling

Our initial sample, aimed at examining the impact of corporate carbon trading on firm performance, includes 728 companies listed on both the Hanoi Stock Exchange (HNX) and the Ho Chi Minh City Stock Exchange (HOSE) during the period of 2010-2022. However, to align with the research models and methods presented in Section 3.2, we apply some exclusive criteria. Firstly, we remove all companies belonging to the financial sector such as banks, financial companies, and stock and insurance companies. Secondly, we exclude all companies that provide insufficient data for use in Eq. (1) below. Following this data cleaning process, the final sample comprises 595 companies, corresponding to 7735 observations.

Additionally, we divide our sample into various industries according to the Industrial Classification Benchmark with modifications for Vietnam. The results from Table 1 indicate that the majority of CDM projects conducted in Vietnam belong to the Community Services industry. The remainder are in other industries, including Industry, Consumer Goods, and Oil & Gas.

Table 1: Firms' breakdown by industry

Industry	Number of firms	Number of CDM observations
Information & Technology	30	0
Industry	222	4
Consumer services	80	0
Medicine & Healthcare	26	0
Consumer goods	87	4
Raw materials	95	0
Community services	50	12
Oil & gas	5	1

3.2. Empirical models and research methods

To assess the impact of corporate carbon trading on the performance of Vietnamese listed companies, we employ regression analysis approach with three consecutive methods: Pool Ordinary Least Square (OLS), Fixed Effect Model (FEM) and Random Effect Model (REM). This quantitative approach allows us to systematically analyze the relationships between the binary variable indicating independent performance and the qualitative control variable arising. The model (1) is constructed as follows:

(1) $TobinQ_{it} = \alpha_0 + \alpha_1 CDM + \alpha_2 SIZE_{it} + \alpha_3 LEV_{it} + \alpha_4 LIQ_{it} + \alpha_5 BIG4_{it} + \alpha_6 AGE_{it} + \varepsilon_{it}$

Where the subscripts *i* and *t* represent firm *i* and year *t* respectively. The dependent variable, Firm Performance, is measured by market index (Tobin's Q). Meanwhile, the independent variable of corporate carbon trading is measure by whether the listed company has a project with the Clean Development Mechanism (CDM) or not. In addition to both dependent and independent variables, we also include firm-level controlling variables consisting of firm size, firm leverage, firm liquidiy, audit quality and firm age in Eq. (1). All variables are defined in Table 2 below:

Table 2: Variables definitions in Eq. (1)

Variables		Explanation
Dependent variable		
TobinQ	Firm performance	Market capitalization divide by total assets
Independent variable		
CDM	Corporate carbon trading	A dummy variable, taking the value of 1 if the company has a CDM project; and 0 otherwise
Control variables		
SIZE	Firm size	Natural logarithm of total assets
LEV	Firm leverage	Total debt divided by total equity
LIQ	Firm liquidity	Current assets dividend by current liabilities
BIG4	Audit quality	A dummy variable, taking the value of 1 if the company was audited by the big four audit firms, including Deloitte, PwC, EY, KPMG; and 0 otherwise
AGE	Firm age	Natural logarithm of years since the business was established

Notes: Table 2 presents the detailed calculations for each variable identified in model (1) as discussed in the Empirical Model and Research Method section above.

4. Empirical results

4.1. Descriptive statistics and correlation matrix

The descriptive statistics provided in Table 3 below offer a comprehensive overview of variables in Eq. (1) characterizing Vietnamese listed companies from 2010 to 2022. Tobin's Q, which measures market value relative to book value, reveals an average of 1.739 with notable variability spanning from 0.049 to 11.610, indicating diverse levels of market valuation among the observed firms. The low mean value of 0.005 for Clean Development Mechanism (CDM) projects suggests that only a small fraction of companies in the sample engage in such initiatives, underscoring the limited adoption of carbon trading practices. Moreover, the average firm size, reflected by the natural logarithm of SIZE, stands at 26.716, with variation ranging from 20.369 to 33.585, indicating a diverse spectrum of company sizes within the dataset. Additionally, the mean leverage ratio (LEV) of 0.2119 signals a moderate level of debt financing across firms, with some companies exhibiting higher leverage up to a maximum of 0.870. Liquidity (LIQ) statistics, with an average ratio of 2.149 and significant variability from 0 to 15.811, highlight differences in firms' ability to meet short-term obligations. Furthermore, the proportion of firms audited by one of the Big Four auditing firms (BIG4) is relatively low, as indicated by the mean of 0.270, suggesting varying levels of audit quality within the sample. Lastly, the average age of firms (AGE) at 3.131 years, with variation ranging from 0 to 4.356 years, provides insights into the distribution of firms across different stages of maturity. These descriptive metrics not only illuminate the characteristics of the dataset but also lay the groundwork for further analysis.

Table 3: Descriptive statistics

Variables	Observations	Means	Std. Dev.	Min	Max
TobinQ	7735	1.739	0.929	0.049	11.610
CDM	7735	0.005	0.067	0	1
SIZE	7735	26.716	1.879	20.369	33.585
LEV	7735	0.2119	0 .187	0	0.870
LIQ	7735	2.149	2.008	0	15.811
BIG4	7735	0.270	0.444	0	1
AGE	7735	3.131	0.692	0	4.356

Note: Table 3 presents descriptive statistics of the variables in Eq. (1). The definitions of these variables are provided in Table 2.

Table 4 below presents the results of correlation matrix of all variables in Equation (1). The positive correlation coefficient between CDM and Tobin's Q aligns with our expectation, implying that companies engaging in CDM projects may enhance their firm performance. Moreover, all correlation coefficients among independent and controlling variables in Equation (1) are very low, indicating the absence of multicollinearity in our model.

Table 4: Correlation matrix

	TobinQ	CDM	SIZE	LEV	LIQ	BIG4	AGE
TobinQ	1.000						
CDM	0.038	1.000					
SIZE	0.145	-0.023	1.000				
LEV	-0.116	0.041	0.120	1.000			
LIQ	0.188	0.018	0.192	-0.176	1.000		
BIG4	-0.014	0.007	0.026	0.009	0.012	1.000	
AGE	0.017	0.023	0.122	0.025	-0.053	-0.043	1.000

Note: Table 4 presents the correlation coefficient results of the variables in Eq. (1). The definitions of these variables are provided in Table 2.

4.2. Results and discussions

To investigate the impact of corporate carbon trading on the performance of Vietnamese listed companies from 2010 to 2022, particularly focusing on CDM projects, we conducted three regression methods comprising OLS, FEM, and RE). Additionally, we applied the F-test and Breusch-Pagan LM test to determine the most suitable method. The results of these tests are presented in Table 5 below. Both the Prob>F and Prob>chi2 values are below 5%, leading to the selection of the FEM. However, upon using the modified Wald test, we identified the presence of heteroskedasticity. Consequently, we ran the FEM with robust standard errors to address this issue.

The regression coefficient between CDM and TobinQ is 0.436, which is statistically significant at the very high level of 1%, indicating that the Clean Development

Mechanism (CDM) has a positive impact on Tobin's Q. This suggests that companies engaged in carbon credit trading projects under the CDM framework enhance firm performance, as reflected in the Tobin's Q market value. These results support our research hypothesis and align with previous studies such as Zhang et al. (2020), Chen et al. (2022), and Zhang and Gan (2023).

The positive impact of carbon trading activities on the business performance of listed companies in Vietnam can be explained by several reasons. Firstly, in the current context of Vietnam's green economy orientation, companies involved in environmentally supportive activities signal their commitment to sustainable development, emphasizing long-term effectiveness to stakeholders. Secondly, companies with CDM projects fulfill commitments to the community, society, and the environment, aligning stakeholder interests with the financial performance of the company. Finally, implementing CDM projects signifies recognition of the potential of the carbon market in Vietnam. As information about the establishment of a carbon trading exchange in the future emerges, companies listed on the stock exchange that have implemented CDM projects serve as evidence of effective analysis, forecasting, and anticipation of future development directions. This effectively builds trust with investors and the market regarding the long-term growth potential of the enterprise. Consequently, companies continually strive to develop appropriate strategies to maintain and enhance business efficiency.

Among the control variables, the SIZE variable and the AGE variable have demonstrated a positive relationship with Tobin's Q, while the LEV variable has a negative impact on firm performance. This indicates that companies with larger size and longer establishment times tend to achieve better financial performance, but high financial leverage acts as a hindrance to the Tobin's Q index of the company. The R-squared coefficient of 0.1621 indicates that the independent and control variables in model (1) explain 16.21% of the variance in firm performance measured through the Tobin's Q index.

Table 5: Regression results for the impact of corporate carbon trading on firm performance of Vietnamese listed companies during 2010-2022

Variable	OLS	FEM	REM	Robust FEM
CDM	0.4357**	0.436***	0.400***	0.436***
	(2.57)	(2.79)	(2.57)	(7.01)
SIZE	0.090***	0.096***	0.090***	0.097***
	(15.32)	(15.89)	(15.32)	(12.72)
LEV	-0.679***	-0.688***	-0.679***	-0.690***
	(-11.87)	(-12.03)	(-11.87)	(-16.30)
LIQ	0.024	0.156	0.057	0.062
	(1.26)	(1.05)	(1.02)	(1.04)
BIG4	-0.039	-0.027	-0.039	-0.028
	(-1.65)	(-1.14)	(-1.65)	(-1.00)
AGE	0.156*	0.024**	0.027*	0.025**
	(2.69)	(1.25)	(1.15)	(1.75)
Constant	0.572*	0.692**	0.238*	0.710**
	(0.24)	(0.25)	(0.15)	(0.34)
No of obs.	7735	7735	7735	7735
R^2	0.1557	0.1562	0.1560	0.1621
F-test	Prob>F = 0.024			
Breusch - Pagan LM test	Prob>chi2 = 0.000			
Modified Wald test	Prob>chi2 = 0.023			

*Notes: Table 5 presents regression results in Eq. (1). The definitions of these variables are provided in Table 2. The symbols *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively.*

5. Conclusion and recommendations

This paper aims to examine the impact of corporate carbon trading on firm performance in Vietnamese listed companies during the period of 2010-2022, wherein corporate carbon trading is measured by whether a company has a CDM project or not. By employing various regression alongside other tests to choose the most suitable model, the results demonstrate that FEM is the most appropriate selection. The FEM results indicate a positive relationship between corporate carbon trading and firm performance, proving that Vietnamese listed companies with CDM projects can enhance firm performance, as represented by Tobin's Q.

Given the positive correlation between corporate carbon trading and financial success, businesses are encouraged to integrate carbon trading schemes as a key component of their sustainability plans to secure foreseeable profits from these initiatives. Moreover, since the impacts of carbon trading initiatives on financial performance require thorough monitoring and evaluation, prioritizing them will enable firms to effectively engage in carbon markets over time. However, businesses may not adopt this approach unless there is a favorable investment environment for carbon trading, and the responsibility to create such an environment lies with local authorities. Through the implementation of precise and consistent legislative actions and policies, governments can support and incentivize increased participation in carbon markets while preserving environmental integrity.

References:

Chen, Y., Xu, Z., Zhang, Z., Ye, W., Yang, Y., & Gong, Z. (2022). Does the carbon emission trading scheme boost corporate environmental and financial performance in China?. Journal of Cleaner Production, 368, 133151.

Jia, Z. (2023). The hidden benefit: Emission trading scheme and business performance of downstream enterprises. Energy Economics, 117, 106488.

Maraseni, T. N., & Cadman, T. (2015). A comparative analysis of global stakeholders' perceptions of the governance quality of the Clean Development Mechanism (CDM) and reducing emissions from deforestation and forest degradation (REDD+). International Journal of Environmental Studies, 72(2), 288-304.

Marin, G., Marino, M., & Pellegrin, C. (2018). The impact of the European Emission Trading Scheme on multiple measures of economic performance. Environmental and Resource Economics, 71, 551-582.

Peng, H., Qi, S., & Cui, J. (2021). The environmental and economic effects of the carbon emissions trading scheme in China: The role of alternative allowance allocation. Sustainable Production and Consumption, 28, 105-115.

Ramiah, V., Pham, H. N. A., Wang, I., Dang, V. N. T., Veron, J. F., & Duong, H. (2017). The financial consequences of abolishing a carbon trading system. Applied Economics Letters, 24(13), 936-939.

Wang, H., Ye, S., Chen, H., & Yin, J. (2023). The impact of carbon emission trading policy on overcapacity of companies: Evidence from China. Energy Economics, 126, 106929.

Zhang, Y. J., & Liu, J. Y. (2019). Does carbon emissions trading affect the financial performance of high energy-consuming firms in China?. Natural Hazards, 95, 91-111.

Zhang, Y. J., Liang, T., Jin, Y. L., & Shen, B. (2020). The impact of carbon trading on economic output and carbon emissions reduction in China's industrial sectors. Applied Energy, 260, 114290.

Zhang, S., & Gan, H. (2023). Is carbon emission trading a green blessing or a curse for firm performance in China? A quasi-experiment design and exploring the spatial spillover effect. Environmental Science and Pollution Research, 1-17.

Zimmer, A., Jakob, M., & Steckel, J. C. (2015). What motivates Vietnam to strive for a low-carbon economy?—On the drivers of climate policy in a developing country. Energy for Sustainable Development, 24, 19-32.

DOES TIKTOK VIDEO ADVERTISEMENTS MOTIVATE BUYING INTENTION OF GENERATION Z IN VIETNAM?

Luu Thi Minh Ngoc* - Nguyen Phuong Mai* - Dang Thi Huong - Vu Thi Minh Hien****

Abstract: ***This paper aims to explore the impact of TikTok video advertisements on the buying intention of Vietnamese Generation Z. A research model was adapted from the Theory of Planned Behavior (TPB) with four independent variables, including Informativity, Entertaining, Interactivity and Disturbance. A self-administered online survey was conducted using the convenient sampling method from January to March 2022. After three months, nearly 3000 valid responses were received. PLS-SEM analysis was used to test the hypotheses. Our findings showed that Interactivity has the strongest impact on the buying intention of Vietnamese Generation Z, followed by Entertaining and Informativity. Based on the findings, some suggestions for policymakers and marketers were proposed to promote trading on the TikTok platform.***

• Keywords: *TikTok, video advertisement, buying intention, generation Z, Vietnam.*

JEL codes: M31, M37, O32

Date of receipt: 02nd February, 2024 *Date of receipt revision: 20th March, 2024*

Date of delivery revision: 15h February, 2024 *Date of approval: 25th March, 2024*

1. Introduction

After over two decades of formation and development, social networking has become an integral part of human life. Social networking sites (SNS) not only enable people to connect and share with each other but also facilitate business activities. In the past, enterprises primarily relied on traditional advertising channels. Nowadays, they can use online advertising tools to access customers more rapidly. Online advertising has shown its strengths and therefore received concerns from enterprises. According to the data of Adsota on Vietnam's online advertising market, online advertising has become the top choice of many enterprises, with their spending on this tool increasing gradually over the years, specifically from 22.5% in 2019 to 23.4% in 2020, 24.2% in 2021 and an estimated of 24.7% in 2022. Online advertising turnover in Vietnam may reach 400 million VND, rising by 116 million USD against 2019.

Among various online advertising channels, TikTok represents a fully potential one with a record high growth rate (increasing by 1157.76% of the total number of global users from January 2018 to July 2020). According to the statistics of *We are social*, TikTok currently has more than 850 million users and is the social networking site with the seventh fastest growth rate in the world, overtaking Twitter, Telegram, RedDIT, Pinterest, and Snapchat in the number of users. ByteDance statistics reveal that by early 2022, TikTok will have around 39.91 million users over 18 years old in Vietnam. Also according to statistics of ByteDance, in 2022, advertising on TikTok reached 55.6% of people over 18 years old, equal to 55.4% of Vietnamese Internet users of all ages, among whom the main advertising subjects or TikTok are female.

According to a report by Nielsen on TikTok users, over 52% of users say that they find many new products via advertisements on TikTok, 61% feel that advertisements on TikTok are more impressive than on other sites and videos, 43% share that they find advertisements of TikTok harmonize other TikTok contents. This illustrates that the trend of advertising on TikTok is acknowledged by and affects the buying intentions of Vietnamese consumers, especially Gen Z. Gen Z, or Generation Z, is the term referring to people who were born between 1997 to 2022. Young people in Gen G grow up amid the boom of digital technology such as the Internet, social networks, and mobile devices. This has shaped their strong perceptions of the power of information, mass media, virtual experience, and globalization. Besides, Gen Z also emphasizes themselves and personal freedom

** International School, Vietnam National University Hanoi; email: ltmngoc@vnu.edu.vn*
*** University of Economics and Business, Vietnam National University Hanoi (Corresponding author; email: huongdth@vnu.edu.vn)*

and love autonomy in life and finance. Thus, they are considered a factor that may trigger booms and create a breakthrough in society.

This paper investigates the impact of video advertisements on TikTok on the buying intentions of Vietnamese Gen Z, then proposes solutions for enterprises to exploit this communication channel and improve their competitiveness effectively. We also raise some proposals to governmental agencies for the effective administration of social networks and facilitate sustainable market development.

2. Literature review and research model

2.1. TikTok

TikTok is a platform for music videos and social networking sites in China. It was introduced in 2017 and is used to create videos of 3 to 15 seconds for music, lip-sync, dances, comedies, and talents and to repeat videos of 3 to 60 seconds (Cervi, 2021). TikTok uses large-scale artificial intelligence to analyze users' preferences based on their interactions with the content via the videos that they like and comment on and the amount of time they spend watching these videos to offer customized content to each individual. To put it another way, instead of basing on connections and "people you know" like in other social networking sites, the algorithm of TikTok provides individualized information via the page "For you" - a source of video information proposed to users based on their actions on the app. It also gives people sharing ability.

2.2. Video advertisements on TikTok

By nature, advertising on video is when enterprises introduce, market, and promote their products via videos and then broadcast them to customers via specific communication channels. Video advertisements have many features that other platforms do not, such as the right to control or skip content they do not like (Lee, Ham, & Kim, 2013).

TikTok has strengths in advertising (Han, 2020). The research findings of Yu Han (2020) reveal that most Chinese people choose TikTok as the platform they like to watch most, far more than other platforms. The special feature of advertisements on TikTok is that the contents are easy to understand, combined with keywords and jingles that make them easily accessible to viewers. Moreover, advertisements on TikTok have high reliability and authenticity via the content, images, comments, reviews, and experience of users. Besides, TikTok has an advantage in the vast number of interactions, which helps to spread information very widely.

2.3. Relations between video advertisements on TikTok and buying intentions

According to Mehta (2000), attitude to advertisements affects the success of any form of advertisement. Attitude to advertisements is determined by social relations and trust. It is assumed to have a positive impact on buying behavior as a positive attitude results in buying behavior and vice versa (Mehta, 2000). Darmatama and Erdiansyah (2021) researched the impacts of advertisements on TikTok and images of beauty products on buying intentions. The research findings indicated that advertisements on TikTok and images of beauty products altogether have considerable impacts on the buying decisions of consumers (Darmatama & Erdiansyah, 2021). Yu Han (2020) believed that there are 5 factors of video advertisements on TikTok that affect consumer attitudes, including entertainment motivation, user-friendliness, customer building, reliability and authenticity, and user interactions. As a result, video advertisements on TikTok affect enterprises' sales (Yang, Zhang, & Zhang, 2021).

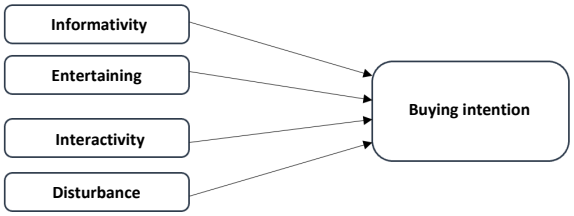
With only 15 to 60 seconds of video advertisements on TikTok, consumers can recognize brands, products, and services (Dewi, 2021). Video advertisements provide further information, increase participation, and build customer trust (Bhuiyan, 2020). Consumers can remember brands or products longer when they are advertised in videos. Ngo et al. (2021) showed that there are 4 main factors of information, entertainment, situation-based experience, and interactions of video advertisements that impact consumer attitudes. Meanwhile, Jain and Rakesh (2018) pointed out that informativity, entertaining, and invasiveness can affect the attitudes and buying intentions of customers, especially the young. Bhuiyan (2020) proved that video advertisements attract customers more than static or image advertisements. Digital video advertisements help enterprises create more substantial brand recognition, establish close links with consumers, and build trust in the advertised products or brands.

2.4. Research model and hypotheses

From the literature review, it can be seen that video advertisements have impacts on customer attitudes and buying intention. Therefore, in this study, we adopted and adapted the variables that influence buying intention from existing studies of

Jain and Rakesh (2018), Ngo et al. (2021), and Hsu & Tsou (2011). Thus, a research model with four independent variables was developed (see Figure 1).

Figure 1: Proposed research model



Informativity is one of the most critical elements of an advertisement; regardless of its form, providing information is the primary purpose of an advertisement. According to Waldt et al. (2009), informativity in advertising is defined as the ability of advertisements to inform consumers of alternative product choices so that they can conduct their buying behavior in the most satisfying condition. Information is a vital element to online advertisements as potential customers usually require additional information for products that they have demand for (Ducoffe, 1995). Advertisements on TikTok are particular as information is provided very quickly, vividly, and conveniently, they impact consumers via sights and sounds. Thus, hypothesis 1 is proposed:

H1: Informativity of video advertisements on TikTok has a positive impact on the buying intentions of Vietnamese Gen Z.

Entertaining is the factor that brings emotion to users when they watch advertisements. Entertaining has a significant impact on ads; it exerts a positive effect on the perceived value and attitude of buyers (El-Ashmawy & El Sahn, 2014; Tsang, Ho, & Liang, 2004). Entertaining attracts customers and encourages their interactions, thus creating intensive links and familiarizing them with the products or services. According to Ducoffe (1995), entertaining online advertisements have a positive impact on consumer behavior. Hoffman et al. (1996) also pointed out that the more satisfied and interacted that customers are with Internet-based marketing tools, the more positive their attitudes and mood become. The advertisement's perceived entertainment strongly impacts consumer attitude toward that advertisement (Shavitt, Lowrey, & Haefner, 1998). Tsang et al. (2004) also affirmed that the entertaining element in the advertisement has a positive impact on the perceived value and behavior of consumers. From the above arguments. hypothesis H2 is proposed as follows:

H2: Entertaining of video advertisements on TikTok has a positive impact on the buying intentions of Vietnamese Gen Z.

Interactivity refers to the interactions between advertisement viewers and the advertisements (Luu, 2021). The interactions of a group of consumers with the advertisements can affect the perception of the remaining consumers. Interactivity is the level of interactions between consumers and forms of advertisements. Cho and Leckenby (1999), Wu (1999), Sukpanick and Chen (2000) categorized interactivity into 3 groups of interactions between "people and people", "people and messages", and "people and computer". Research indicated that interactivity is the factor affecting the attitude of users to advertisements. The measurements of interactivity in this research are chosen according to the research on factors affecting the perceived value of customers and attitudes to advertisements by Brackett and Carr (2001), Wang et al. (2005), and Ko et al. (2005). The interactivity helps enterprises not to pay high costs but can still increase the frequency of advertisements. Using artificial intelligence (AI) to analyze and propose preferences of users, TikTok allows enterprises to directly target potential customers, making advertisements appear more frequently on user accounts. Therefore, hypothesis H3 is formulated as follows:

H3: Interactivity of video advertisements on TikTok has a positive impact on the buying intentions of Vietnamese Gen Z.

Interactions help to increase viewers' attention to advertisements, but the high frequency of advertisements may cause dissatisfaction among users, or the so-called "disturbance". Disturbance is the annoyance that advertisements bring to users resulting from the very high frequency, insulting contents and images, which may include exaggeration, violence or unsuitability with traditional culture. Unlike the three earlier-mentioned factors that positively impact advertisements, "disturbance" causes negative impacts that advertisers should avoid. Disturbance causes not only advertising inefficiency but also reverse effects, making consumers dissatisfied, even irritated, with products and services. According to Ducoffe (1995), advertisements using techniques that cause annoyance, insult, or exaggeration may result in unexpected impacts on customers, and they feel disturbed by these advertisements. The annoyance will reduce the effectiveness of the advertisements

and lead to dissatisfaction among consumers. In this regard, we develop hypothesis H4 as follows:

H4: Disturbance of video advertisements on TikTok has a positive impact on the buying intentions of Vietnamese Gen Z.

3. Research methodology

3.1. Measurements

The present study used quantitative analysis to estimate the impacts of video advertisements on TikTok on the buying intention of Vietnamese Gen Z. Research measurements inherited from previous studies were adjusted to be compatible with the research context. Before being used for the official survey, the questionnaire was tested via in-depth interviews with 10 experts and consumers to evaluate the appropriateness of the questions. Table 1 shows the measurement items that have been checked and accepted for the official survey.

Table 1: Measurements

Code	Factors	Variable	Author(s)
INF	Informativity	Information presented in the video advertisements is accurate and reliable (INF1)	Ngo et al. (2017), Dewi (2021).
		Information about brands or products/ services in the video advertisements is constantly updated (INF2)	
		Video advertisements provide more information (INF3)	
		Video advertisements provide sufficient information about the advertised brands (INF4)	
		Video advertisements provide sufficient information about the advertised products/ services (INF5)	
		Information about the products is more than information about the enterprises (INF6)	
ENT	Entertaining	Advertisements via videos are interesting and attractive (ENT1)	Ngo et al. (2017), Dewi (2021)
		Advertisements via videos are more interesting than other forms of advertisements (ENT2)	
		You prefer funny advertisements to emotional ones (ENT3)	
		You like advertisements with meaningful social messages (ENT4)	
		You like video advertisements with content like a short film (ENT5)	
INT	Interactivity	You frequently see video advertisements on TikTok (INT1)	Ngo et al. (2017), Dewi (2021), Brackett and Carr (2001), Wang et al. (2005), Ko et al. (2005)
		You prefer video advertisements on TikTok to other forms of advertisements because you can interact with them (like, share, comment, tag friends) (INT2)	
		You often like, share, comment on video advertisements on TikTok because of their informativity rather than their entertaining (INT3)	
		You usually interact with video advertisements shared by your idols (INT4)	
		The interaction volumes of the video advertisements determine whether you will watch them (INT5)	
DIT	Disturbance	You feel disturbed when a video advertisement appears many times (DIT1)	Ngo et al. (2017), Dewi (2021)
		The advertisement contents annoy you (DIT2)	
		Video advertisements on TikTok causes annoyance (DIT3)	
IB	Buying intention	If there is a chance, I will consider buying products posted (discussed) on TikTok videos in the future (IB1)	Hsu & Tsou (2011); Jain et al (2018)
		It is very likely that I will buy products posted (discussed) in TikTok videos in the near future (IB2)	
		If there is a chance, I will definitely buy products posted (discussed) in TikTok videos (IB3)	

The questionnaire was designed in Google Form format and sent to some networks including student clubs, alumni forums and other social networking sites such as Zalo, and Facebook. Firstly, they were sent to students and former students residing in Hanoi, Ho Chi Minh City, Da Nang, Can Tho, and Hai Phong via clubs in universities. Then the questionnaires were sent by people who agreed to participate in the survey to their friends of Gen Z. After 3 months, 2,943 questionnaires were collected. Upon removing invalid ones, 2,867 questionnaires were analyzed. Of the 2,868 recipients, females account for 69%, males 28% and others 3%. 40.1% of the recipients spend less than 1 hour on TikTok, 44.9% spend from 1 to 3 hours, 6.8% from 3 to 5 hours and 3.4% over 5 hours.

3.2. Data analysis

The reliability and validity of measurements were tested by SmartPLS 3.3.9. The impacts of video advertisements on TikTok on the buying intention of Gen Z were evaluated by using Partial Least Squares Structural Equation Modeling (PLS-SEM). We chose PLS-SEM for analysis for some reasons. Firstly, PLS-SEM allows researchers to estimate complicated models with many structures, indicators, and structural paths without imposing data distribution assumptions. Secondly, PLS-SEM is a method of accessing cause-effect estimation with SEM emphasizing the estimation in model statistics with a structure designed to provide cause-effect explanations. Thirdly, PLS-SEM is appropriate with small samples. In this research, a sample of 2,867 recipients is very small to the whole population of Vietnamese Gen Z (about 13 million people). Therefore, PLS-SEM is the most suitable for our research.

4. Research findings

PLS-SEM helped to test the reliability of research measurements via Cronbach's alpha, item loading,

and Composite Reliability (CR). Besides, the validity of the measurements was tested by Variance Inflation Factor (VIF), Average Variance Extracted (AVE), Fornell - Larcker criterion, adjusted R^2, and SRMR. As a result, with R^2 of 0.57422 and SRMR of 0.079 < 0.08, the appropriateness of the model was affirmed. As such, it is possible to conclude that 57.4% of the variations in the buying intention of Gen Z can be explained by the Informativity, Entertaining, Interactivity, and Disturbance in the model, while 42.6% is explained by factors not present in the model (Table 2).

Table 2. Reliability and validity of measurements

Constructs	Items	Loading	VIF	Cronbach's alpha	Composite reliability (CR)	Average variance extracted (AVE)
Buying intentions	IB1	0.926	3.196	0.873	0.922	0.798
	IB2	0.907	2.692			
	IB3	0.846	1.958			
Informativity	INF1	0.706	1.426	0.859	0.895	0.587
	INF2	0.836	2.322			
	INF3	0.778	1.788			
	INF4	0.725	1.701			
	INF5	0.792	2.005			
	INF6	0.752	1.816			
Entertaining	ENT1	0.852	2.307	0.850	0.893	0.626
	ENT2	0.849	2.260			
	ENT3	0.711	1.563			
	ENT4	0.784	2.028			
	ENT5	0.749	1.808			
Interactivity	INT1	0.731	1.635	0.858	0.898	0.639
	INT2	0.789	1.820			
	INT3	0.794	1.808			
	INT4	0.826	2.179			
	INT5	0.852	2.476			
Disturbance	DIT1	0.836	1.896	0.820	0.892	0.734
	DIT2	0.849	1.673			
	DIT3	0.885	2.056			
Adjusted R^2 = 0.574; SRMR = 0.079						

The research findings illustrate that the composite reliability of measurements is higher than 0.7, convergence value is higher than 0.5, so all values meet the testing requirements. With VIF < 5, it is possible to conclude that multilinearity does not significantly affect the results. Besides, the distinguished validity was also tested by the Fornell-Larcker test and HTMT results. Table 3 presents the results of the Fornell-Larcker test.

The results of the Fornell-Larcker test show that all values lie within the cells, with values ranging from 0.766 to 0.894 for all measurements (values are in bold), and they are higher than any correlation coefficients in the related horizontal and vertical cells. As a result, the discrimination validity of the measurement tested in this research is supported.

Table 3. Results of the Fornell-Larcker test

	DIT	ENT	IB	INF	INT
DIT	**0.857**				
ENT	0.523	**0.791**			
IB	0.339	0.674	**0.894**		
INF	0.417	0.714	0.624	**0.766**	
INT	0.406	0.674	0.702	0.605	**0.799**

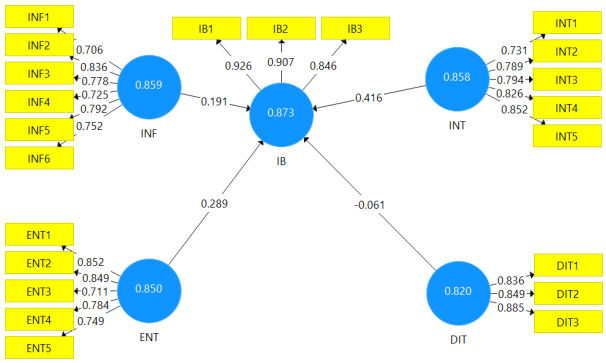
Table 4 presents the results of testing HTMT. The results indicate that all values are lower than 0.791. Therefore, the values of all measurements are accepted.

Table 4. HTMT testing results

	DIT	ENT	IB	INF	INT
DIT					
ENT	0.638				
IB	0.393	0.770			
INF	0.506	0.829	0.704		
INT	0.488	0.792	0.803	0.702	

We also ran an activation analysis to test the structural model. In SmartPLS software, we selected the small samples of 5000 and re-established and inflated the primary samples. The confidence interval methods are bootstrap BiasCor Correct and Accelerated (BCa) with the two-sided hypothesis test with a significant degree of 0.05. The results are presented in Figure 2 and Table 5.

Figure 2: SEM analysis results



Interactivity is found to have the strongest impact on the buying intentions of Gen Z (**β** = 0.461; t = 4.895; p = 0.000), followed by Entertaining (**β** = 0.289; t = 3.327; p = 0.001), Informativity (**β** = 0.191; t = 2.326; p = 0.020). There is no ground to conclude that the Disturbance of video advertisements impacts the buying intentions of Vietnamese Gen Z (**β** = -0.061; t = 0.833; p = 0.405). These results illustrate

that hypotheses H1, H2, and H3 are accepted, and hypothesis H4 is rejected.

Table 5. Hypotheses - Regression coefficients of the model

Hypotheses	Links	β	f^2	T-value	P-value	Conclusion
H1	INF → IB	0.191	0.140	2.326	0.020	Accepted
H2	ENT → IB	0.289	0.173	3.327	0.001	Accepted
H3	INT → IB	0.416	0.254	4.895	0.000	Accepted
H4	DIT → IB	-0.061	0.06	0.833	0.405	Rejected

5. Discussions and implications

The research findings indicate that the three factors of Informativity, Entertaining, and Interactivity positively impact the buying intention of Vietnamese Gen Z. The research model can explain 57.4% of the impacts of video advertisements on TikTok on the buying intention of Vietnamese Gen Z.

These results go in line with the context of Vietnam as a country with a dramatic increase in the percentage of participation and growth rate of e-payment and the number of Internet users of 68 million, accounting for 70% of the population (VCB News, 2020) and 51.8 million engaging in online shopping (Statista, 2022).

Furthermore, our findings help validate the research framework on the impacts of video advertisements on TikTok on buying intentions. In reality, these results align with those of previous studies on the effects of video or social network advertisements on consumers' buying intentions (Bhuiyan, 2020; Luu, 2021; Ngo, 2021). This indicates that video advertisements on TikTok are as effective as other online advertising channels. The research findings also reveal that there is not enough evidence to conclude that the disturbance caused by TikTok video advertisements has negative impacts on the buying intentions of Vietnamese Gen Z. This result contradicts the findings of previous studies on the impacts of disturbance on consumers' buying intentions. However, this difference may depend on the survey subjects. Gen Z is characterized by their openness, willingness to embrace change, and readiness to try new things and take risks, suggesting that the disturbance caused by advertisements may not significantly affect their attitudes and buying intentions.

Currently, the trend of advertising via TikTok is becoming very popular, and among various forms, video advertisements are considered the most widely used. Therefore, the research findings can provide enterprises, businessmen, and advertising agencies with an overview of the factors in video advertisements that may affect the buying intentions of Vietnamese Gen Z. This serves as the foundation for them to develop video advertisements, marketing plans, and campaigns to increase the effectiveness of video advertisements in stimulating Gen Z's buying intentions. This, in turn, contributes to boosting sales and profits for sellers. Based on the research findings, we suggest the following solutions:

Firstly, TikTok provides favorable conditions to increase video advertisements. As shown in the analysis results, the interactivity of video advertisements has the strongest impact on the buying intentions of Gen Z, which means that the more interactive a video advertisement is, the higher the buying intentions viewers have. The survey results also reveal that all observation variables in Interactivity have the value around mean, i.e. satisfied, which indicates that the interactivity of video advertisements is not really high and fully exploited. Therefore, the researchers propose that enterprises and advertisement designers should launch appropriate promotional programs to increase the volume of interactions for each video in TikTok (like, share, comment). Currently, there are some methods to increase interactions on TikTok that can be applied, including "TikTok Ads" - a program set up by TikTok to support advertising with many options, employing staff to interact with viewers frequently, to stimulate interactions or providing special offers to TikTok users who have interactions with the videos, etc. Besides, enterprises should control the quality of interactions to avoid virtual interactions or negative comments under the video because the number of interactions of the video can attract and affect the attitudes of the next viewers.

Secondly, entertaining of video advertisements is the factor with the second strongest impact on the buying intentions of Gen Z. According to the research findings, most questionnaire recipients agree that video advertisements are more interesting and attractive than other advertising forms, and Gen Z tend to prefer advertisements in the form of short films. Based on these findings, the researchers conclude that entertaining is a factor that encourages Gen Z tends to follow advertisements, helping the videos to spread on social networks. Besides, since most variables have scores around 'agree/implement well' rather than 'definitely agree/implement very well,' it is necessary to pay more attention to the

entertaining content of the videos and integrate elements that Gen Z, in particular, and target customers, in general, love. Video advertisements in the form of short movies are quite popular with Gen Z, so advertisement designers may develop their videos in this direction. However, as the tastes of Gen Z are changeable and diverse, designers should also create and exploit new ways to make the videos more attractive. For different groups of customers, different approaches should be used; for Gen Z, they love creative, lively, youthful, familiar content with new and unique life attitudes. Moreover, it is ideal if advertisements can be both informative and entertaining, as they may increase the motivation of customers to watch the videos while still providing sufficient information to pique curiosity and influence the buying intentions of Gen Z.

Thirdly, Informativity of video advertisements is the factor with the third strongest impact on the buying intentions of viewers. Analysis indicates that the informativity of video advertisements has been effectively exploited. However, video advertisements should contain more useful information, especially information on products and brands, at the same time ensure that the information is accurate. It is also necessary to base on the categories of goods to provide information to improve the reliability of the advertisements. For example, with food, there should be more information about origins, flavor, accompanying items, suggestions for spice addition or reduction to suit each person's tastes. Or with fashion products, the videos should provide information on sizes, colors, materials or advice on product preservation and matching. It is necessary to provide sufficient information about brand names and products.

References:

Bhuiyan, A. I. (2020). Impacts on Consumer Behavior through Online Video Advertisement.

http://dspace.bracu.ac.bd/xmlui/bitstream/handle/10361/15636/16304100_BBA.pdf?sequence=1&isAllowed=y

Brackett, L. K., & Carr, B. N. (2001). Cyberspace Advertising vs. Other Media: Consumer vs. Mature Student Attitudes. Journal of Advertising Research, 41(5), 23-32.

Cervi, L. (2021). TikTok and Generation Z. Theatre, Dance Performance Training, 12(2), 198-204.

Cho, C.-H., & Leckenby, J. D. (1999). Interactivity as a Measure of Advertising Effectiveness: Antecedents and Consequences of Interactivity in Web Advertising. Paper presented at the Proceedings of the conference-american academy of advertising.

https://www.tib.eu/en/search/id/BLCP:CN031412086/Interactivity-as-a-Measure-of-Advertising-Effectiveness?cHash=688bfb5f2f0769e82ac1554cd679808a

Darmatama, M., & Erdiansyah, R. (2021). The Influence of Advertising in Tiktok Social Media and Beauty Product Image on Consumer Purchase Decisions. Paper presented at the International Conference on Economics, Business, Social, and Humanities (ICEBSH 2021).

https://doi.org/10.2991/assehr.k.210805.140

Der Waldt, V., La Rey, D., Rebello, T., & Brown, W. (2009). Attitudes of Young Consumers towards SMS advertising. African Journal of Business Management. 3(9).

https://www.researchgate.net/publication/253840844_Attitudes_of_young_consumers_towards_SMS_advertising.

Dewi, Y. R. (2021). Creating Customer Engangement and Customer Value within 15 second: How Tiktok Works for Content Marketing. AMAR, 5(1), 33-45.

Ducoffe, R. H. (1995). How Consumers Assess the Value of Advertising. Journal of Current Issues Research in Advertising, 17(1), 1-18.

El-Ashmawy, M., & El Sahn, F. (2014). Measuring University Student's Attitude towards Facebook Advertising. The Macrotheme Review, 3(9), 40-55.

Han, Y. (2020). Advertisement on TikTok as a Pioneer in New Advertising Era: Exploring its Persuasive Elements in the Development of Positive Attitudes in Consumers. The Frontiers of Society, Science Technology, 2(11), 81-92. DOI: 10.25236/FSST.2020.021113.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in Hypermedia Computer-mediated Environments: Conceptual Foundations. Journal of Marketing, 60(3), 50-68.

Hsu, H. Y., & Tsou, H.-T. (2011). Understanding Customer Experiences in Online Blog Environments. International Journal of Information Management, 31(6), 510-523.

Jain, G., Rakesh, S., & Chaturvedi, K. R. (2018). Online Video Advertisements' Effect on purchase Intention: An Exploratory Study on Youth. Research International Journal of E-Business, 14(2), 87-101.

Ko, H., Cho, C.-H., & Roberts, M. S. (2005). Internet Uses and Gratifications: A Structural Equation Model of Interactive Advertising. Journal of advertising research, 34(2), 57-70.

Lee, J., Ham, C.-D., & Kim, M. (2013). Why People Pass along Online Video Advertising: From the Perspectives of the Interpersonal Communication Motives Scale and the Theory of Reasoned Action. Journal of Interactive Advertising, 13(1), 1-13.

Luu, T. M. N. (2021). The Impact of Social Network Advertisements on Consumers' Purchasing of Jewelry Products in Vietnam. VNU Journal of Economics and Business. 37(2), 51-61.

Mehta, A. (2000). Advertising Attitudes and Advertising Effectiveness. Journal of Advertising Research, 40(3), 67-72.

Ngo Thi Thuy Ngan, Mai Thi Hoai Thuong., Nguyen Luong Bao Tran, Tran Thi Thao, Vo Thi Nhu Y, Nguyen Thao Trang, Truong Van Thanh. (2021). A Study on Impacts of Short-video Advertisements on Social Networks on Consumer Attitudes to Brands. Retrieved from Economic School, Da Nang University, Vietnam.

Ngo My Tran, Mai Vo Ngoc Thanh. (2017). Analysis of the impact of social media advertising on the purchase intention of consumers in Can Tho. Can Tho University Journal of Science, 48, 66-76. https://doi.org/10.22144/ctu.jvn.2017.631

Shavitt, S., Lowrey, P., & Haefner, J. (1998). Public Attitudes toward Advertising: More Favorable Than You Might Think. Journal of advertising research, 38(4), 7-22.

Sukpanich, N., & Chen, L.-d. (2000). Interactivity as the Driving Force behind E-commerce. AMCIS (Americas Conference on Information Systems) Proceedings, 834-836.

https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1679&context=amcis2000

Tsang, M. M., Ho, S.-C., & Liang, T.-P. (2004). Consumer Attitudes toward Mobile Advertising: An Empirical Study. International Journal of Electronic Commerce, 8(3), 65-78.

Zhang, P., Wang, C. (2005). An Empirical Study on Consumer's Perceived Value and Attitude toward Advertising. Paper presented at the Proceedings of the 6th Global Information Technology and Management (GITM) World Conference.

https://www.researchgate.net/publication/257395494_An_Empirical_Study_on_Consumers_Perceived_Value_and_Attitudes_toward_Advertising.

Wu, G. (1999). Perceived Interactivity and Attitude toward Web sites. Paper presented at the Proceedings of the conference-American Academy of Advertising.

Yang, J., Zhang, J., & Zhang, Y. (2021). Influencer Video Advertising In Tiktok. Mit Initiative On The Digital Economy, 4, 1-5.

EXPERIENCE OF ANIMAL FEED PRODUCTION CORPORATIONS IN IMPROVING INNOVATION CAPACITY: LESSONS FOR VIETNAMESE BUSINESSES

MSc. Nguyen Minh Dung* - PhD. Nguyen Hong Chinh**

Abstract: ***Along with the development of the livestock industry, the industrial animal feed industry in Vietnam has also grown quite impressively, reaching an average annual growth rate of 13%-15%. With high development potential, Vietnam's animal feed industry has attracted many businesses to join the sector, especially foreign-invested enterprises that are continually expanding their scale, creating fierce competition in the industry. Therefore, finding a new direction to promote the development of Vietnam's animal feed industry in the coming years is extremely necessary. Based on the analysis and evaluation of experiences in improving the innovation capacity of the world's leading feed production enterprises and corporations, the article will draw lessons from these experiences to enhance the innovation capacity of Vietnamese animal feed production enterprises.***

• Keywords: *market, animal feed, Vietnam, innovation.*

JEL codes: M00

Date of receipt: 28th December, 2023 *Date of receipt revision: 23th January, 2024*

Date of delivery revision: 29th December, 2023 *Date of approval: 27th January, 2024*

1. Introduction

In the context of international integration, Vietnam has actively engaged in signing various free trade agreements with countries, bringing both opportunities and challenges to the domestic market, including the animal feed market. Given its heavy reliance on imported sources, Vietnam's animal feed industry and businesses within it are significantly influenced by fluctuations in the international market.

With robust development potential in recent years, Vietnam's animal feed market has attracted numerous businesses, including many foreign-invested enterprises expanding their manufacturing operations. Notable names include Cargill Group (USA), CP Group (Charoen Pokphand Group - Thailand), De Heus (Netherlands), New Hope (China), BRF (Brazil), Mavin (France), Japfa (Singapore), CJ (Korea), and others. The influx of global brands investing in Vietnam's animal feed market has intensified competition between domestic and foreign-invested businesses.

Presently, the country hosts 269 complete mixed industrial animal feed production facilities with a total design capacity of up to 43.2 million tons. Of these, 90 factories are owned by FDI enterprises, and 179 factories are owned by domestic enterprises. Leveraging advantages in capital, technology, and production costs, foreign-invested enterprises (FDI) hold a significant market share of animal feed output. In 2022, the country's industrial animal feed output is expected to reach 20 million tons, with FDI enterprises accounting for 60% and domestic enterprises making up the remaining 40%.

Despite having a larger number of factories, domestic enterprises' market share is notably smaller than that of recently invested FDI enterprises. Notably, many of these FDI enterprises are global brands, originating from countries with highly developed livestock farming such as China, the US, or Korea. Projections suggest that the continued growth of FDI enterprises will further challenge Vietnamese enterprises in the domestic market.

In the long term, domestic animal feed production enterprises need to adopt breakthrough solutions, including enhancing innovation capacity, implementing sustainable production development plans, and fostering autonomy in raw material sources for animal feed production. These measures

** Vietnam General Confederation of Labor*
*** Academy of Finance*

are crucial for domestic enterprises to effectively compete with FDI enterprises. Therefore, studying the experience of improving the innovation capacity of the world's leading feed production enterprises and corporations holds great significance for Vietnamese feed production enterprises in the coming period.

2. Experience of corporations in improving innovation capacity in the animal feed industry

Despite significant macroeconomic challenges affecting the entire supply chain, global animal feed production remained stable in 2022 at 1.266 billion tons, representing a decrease of less than half a percent (0.42%) compared to 2021 estimates. The top 10 animal feed producing countries in 2022 are China (260.739 million tons), the USA (240.403 million tons), Brazil (81.948 million tons), India (43.360 million tons), Mexico (40.138 million tons), Russia (34.147 million tons), Spain (31.234 million tons), Vietnam (26.720 million tons), Argentina (25.736 million tons), and Germany (24.396 million tons).

Furthermore, these top 10 countries collectively produce 64% of the world's animal feed output, with half of the world's global animal feed consumption concentrated in four countries: China, the US, Brazil, and India. According to Watt Global Media (2023), significant changes are observed in the Top 10 rankings. The 2022 data indicates that China's New Hope Group has risen to No. 1, attributed to the company's steady growth despite the pressure of rising input costs and challenges in pig and poultry farming. In contrast, CP Group ranked 5th, and Cargill Group ranked fourth.

Here are the 12 leading animal feed production companies in each continent, including Asia, Europe, North America, South America, and the Middle East.

Table 1: Top 12 leading animal feed enterprises in the world in 2022

Company name	Nation	Production output (1000 tons)	Main production areas
New Hope Group	China	28,220	Feed for pigs, poultry, large cattle;
Haid Group	China	21,650	Feed for aquatic animals, pigs, poultry, large livestock
Muyan Foostuff	China	20,000	Food for pigs, poultry, large cattle, aquatic products, horses, and pets
Cargill	USA	17,175	Aquatic food, horses, pets, pigs, poultry, large livestock...
CP Group	Thailand	17,175	Aquatic food, pigs, poultry, pets, large livestock...
Land O'Lakes	USA	13,500	Aquatic food, pigs, poultry, pets, large livestock...
Wen's Food Group	China	13,000	Poultry and pig feed
De Heus	Netherlands	12,000	Aquatic food, pigs, poultry, pets, large livestock...
Tyson Foods	USA	12,000	Feed for poultry, pigs, large cattle, pets
Shuangbaotai Group (Twins Group)	China	11,800	Food for pigs, poultry, large livestock, pets
BRF	Brazil	10,071	Pig food
Chia Tai Investment	China	10,000	Food for pigs and poultry

Source: Watt Global Media, 2023

It is useful to learn about the innovation experiences of animal feed production corporations in the world's top 10 to draw lessons for Vietnamese businesses in the field of animal feed production. of great significance in the current context.

2.1. Experience of New Hope group

New Hope Group is a leading global corporation and the largest animal feed production group in China. It is also one of the largest corporations specializing in the agricultural sector in the country. Established in 1982, the company has evolved into four main industries: livestock and food, chemicals and resources, real estate and infrastructure, and finance and investment. Currently, the group operates over 600 subsidiaries worldwide, including in Vietnam, Cambodia, the Philippines, Indonesia, Bangladesh, Sri Lanka, Myanmar, Egypt, Turkey, South Africa, Finland, employing about 70,000 people globally. The group's sales have surpassed 18 billion USD (New Hope, 2021).

To enhance innovation, New Hope Group has focused on building and developing its brand according to GAHP standards (good husbandry practices) and product chain management. The development plan of the group includes the construction of animal feed factories and a system of stores providing safe food sources. These food sources are delivered from the group's farms or other farms using Newhope's breeds and feed. New Hope Group is dedicated to building a modernized agricultural production system, striving to establish a smoothly circulating production line for continuous, scaled livestock industry, and has been one of the earliest businesses to introduce a food safety assurance system in agricultural production. This ensures the provision of quality, safe, and healthy products to farmers.

Moreover, the group places special emphasis on developing a team of young leaders and continues to innovate by applying internet technology, especially in the context of the ongoing 4.0 industrial revolution. The group has invested, researched, and collaborated

with foreign countries, applying advanced scientific levels and the world's leading techniques in animal nutrition. In a short time, it has successfully built the brand 'New Generation Animal Feed,' with nearly 100 businesses across China and countries around the world.

With the comment, 'These days, animal feed production in China never makes a loss unless you have internal management problems. Less than 20% of China's livestock companies are capable of being self-sufficient in feed, while 80-90% of them have to buy feed from feed production companies,' the group has boldly invested in improving quality, product diversification, and innovation. The focus on research and development has contributed to enhancing innovation globally.

2.2. Experience of Cargill group

Originally founded in 1865 as a small grain factory in the U.S., Cargill has evolved into the world's largest private corporation, specializing in providing agricultural products, food, financial services, and various other products. In 2018, this multinational company recorded a revenue of 113.5 billion USD. Cargill exports 25% of all U.S. grain and supplies 22% of all meat to the domestic market (Cargill, 2018).

The group has outlined its goals, focusing on absolute safety, total engagement, enriching the community, customer focus, and sustainable growth. Their factories operate with complete automation, relying on innovative activities. Technology is applied throughout the production process, from mixing to pressing pellets, controlled by just one person in the office. Research and development, along with innovation activities, are of great importance to the company.

Controlling the source of input materials is a top priority due to the high proportion of imported raw materials requiring compliance with quality and safety standards for export. The company follows international practices and tailors its business approach to the specific requirements of each country and industry.

Cargill emphasizes employee training with the motto: 'If you don't have an advantage, don't compete.' The success of the animal feed sector in Vietnam is attributed to Cargill's commitment to meeting customer requirements, especially in marketing. The group continuously improves through training and customer-facing activities, staying ahead in the competitive animal feed industry through investments in research and development.

Cargill actively collaborates with farmers in Vietnam to enhance livestock productivity and health, contributing to improved income. With a strong desire for success, Cargill has sustained continuous development for nearly two centuries, earning recognition as a pioneering company in the manufacturing, trading, and distribution of agricultural and food products. It is also regarded as the world's largest financial products and consulting company.

Human resource development is an integral part of Cargill's strategy. The company has a comprehensive recruitment system to select top candidates and a systematic program to train and develop employees. The commitment to developing human resources underscores Cargill's focus on enhancing innovation capacity.

2.3. Experience of CP group

As Thailand's largest private corporation, the group was initially involved in three sectors: food and agriculture, including livestock farming; convenience stores and other retail operations; and third is communication. The group achieved nearly 45 billion USD in revenue in 2015 and has operations spanning Southeast Asia to China, Europe, and the United States. We invest in 16 countries and employ more than 300,000 people. With an investment and operation network spanning 17 countries and exports to 40 countries on 5 continents, CP Foods in recent years has always ranked among the top in the world in animal feed.

According to the 2021 World's Top Feed Companies ranking by WATT Global Media 2022, CP Group's total feed output in 2021 reached 28.175 million tons, ranking highest in the list of leading feed producers globally. Alongside being the leader in animal feed production output, Thai CP is also the world leader in science and technology investment in this field.

Initially, CP Group mainly produced feed for pigs and chickens but later expanded into feed for livestock (pigs, beef cattle, dairy cows), poultry (broiler chickens, laying hens, meat ducks, ducks, quail), and aquatic products (shrimp, fish). From strictly controlled raw material sources, with a modern laboratory system and the construction of an advanced new-generation factory, the mixing, sterilization, pelleting, and packaging processes - the

elements that make up the complete system in the production of high-quality animal feed and seafood - take place more efficiently. Therefore, CP's animal feed and seafood products well control nutritional value and banned substance residues in raw materials, ensuring high feed conversion efficiency for animals and maximum profits for farmers.

Modern animal feed production technology, using automatic processes, brings safe and high-quality products. Strict production processes ensure compliance with international standards such as ISO, GMP/HACCP, GlobalGAP, ETI. At the same time, CP also ensures production with environmentally friendly standards. All waste after treatment must have low concentration, high waste treatment efficiency (up to 90%), and be recovered and used to serve life needs.

Following experience from Thailand and a number of other countries, CP Foods Vietnam deploys a circular economy in livestock farming with a closed circular model "3F" (feed - farm - food) from farm to table, at the same time applying a number of emission reduction solutions such as improving energy efficiency and biomass energy.

Pursuing an innovation policy, being customer-centric, always focusing on innovation, and improving product and service quality every day is the strength that helps CP break through and become a top-reputed feed manufacturer. The corporation considers new human resources invaluable, encourages employees at all levels to become dynamic, creative, and responsible workers; products produced are safe and environmentally friendly.

Innovative activities always take place inside the closed multi-industry production system according to the model: 3F, which is CPV's strength in producing high-quality and safe food for consumers. The company is transferring closed, high-yield livestock technology to livestock farmers through outsourcing farming, encouraging and supporting farmers to be autonomous in livestock farming activities, helping them become independent farmers and CPV customers in the future.

Through livestock farming cooperation, CP Vietnam has collaborated with farmers to establish more than 3,000 farms nationwide, thereby creating jobs for about 400,000 workers (CP Vietnam, 2019). Currently, CP and Cargill hold nearly 30% of Vietnam's animal feed market share (Cargill 9% market share, CP nearly 20% market share).

The group already operates its own farm, but because labor costs are high and the cost of accumulating land for livestock farming is too high while the ability to supply animal feed and breeds is quite large, CP choosing the livestock farming model is a reasonable choice, taking advantage of the large number of farmers as well as their scattered land fund. This is the flexibility and creativity of the group. Thanks to the processing contract, CP has guaranteed a stable, quality poultry supply at very low prices. By the late '70s, CP had secured a solid position in the livestock industry, controlling everything from feed, breeds, farms to meat processing. It must be said that besides the luck factor, CP's success in taking advantage of technical advances and innovative activities in the livestock sector from its partner Abor Acres is the key factor in the process of dominating Thailand's livestock market.

2.4. Lessons learned on improving innovation capacity for Vietnamese animal feed production enterprises

Through researching the experiences of domestic and foreign enterprises on innovation in enterprises, especially in the transition period from a traditional business model to a flexible, innovative business model based on technology and innovation, lessons can be drawn:

Firstly, lessons on innovative leadership: Leadership is always a particularly important factor in innovation. In the 4.0 industrial revolution, business leaders must be experts, have solid professional knowledge, possess the ability to think creatively and innovatively, demonstrate skills in analyzing and synthesizing information, and have the ability to work and make decisions based on the analysis of evidence and data. Besides, leaders need to adopt an innovative and stylish approach to leadership, demonstrated by always acknowledging and listening.

Second, lessons on policies to encourage innovation: State policies are crucial for innovation in agriculture because agricultural production is highly risky due to the effects of weather factors. To minimize risks, there is a need for an insurance policy for agriculture. This is a new field for both farmers and insurance organizations, so the State needs to have policies to support agricultural organizations. Support policies may include building a favorable and stable legal framework for

research and development activities in agriculture, offering tax incentives, and providing financial access conditions. The Government also needs to promote communication, information, and propaganda on the development of high-tech agriculture, raising awareness and understanding of the knowledge economy for farmers, farm owners, manufacturers, and businesses in agriculture. The formation and development of modern production models require larger initial investment capital than conventional production models, so capital support for development is needed. In addition, lending and debt collection methods and procedures need to be consistent with the characteristics of each type of production model. Procedures must be simple and convenient. Loan and debt collection mechanisms based on seasonal crops and livestock help farmers feel secure in their production.

Third, strengthen the capacity to research and deploy new technologies at manufacturing enterprises, strengthen the connection between the manufacturing sector and the research sector through specific science and technology activities: Strengthen awareness of the key role of technology-based innovation in businesses; support businesses to improve technology innovation capacity; build a technology business model; attract scientific organizations and individuals to participate in national science and technology programs and goals aimed at serving manufacturing enterprises. Encourage and facilitate exhibitions, displays, and the introduction of creative achievements in important areas of traditional production. Establish a number of technological innovation alliances according to industries and production fields; carry out innovation-oriented research collaborations to enhance technological capabilities in enterprises, seizing a number of global impact opportunities on technology-based industrial competitiveness to strongly enhance strong innovation activities towards the production of the future. Focus investment resources on strong research associations, helping to promote and spread innovation across industries and fields in the economy.

Fourth, invest human and financial resources in R&D activities to find practical innovations for your unit. Specifically, the establishment of new or consolidation, investment in the development of existing R&D organizations in the enterprise, such as institutes, centers, R&D departments, laboratories, experimental stations, and registration of scientific activities. Study technology with state authorities (Ministry of Science and Technology, Department of Science and Technology of provinces and cities). Strengthen the organizational structure and human resources, increase investment in equipment, and improve the quality of operations of the enterprise's existing R&D organization in a practical and effective manner. In addition, businesses should actively develop and implement R&D and technological innovation plans according to their own strategies and development goals. Based on the enterprise development strategy, business strategy, and product strategy, propose to build and implement an R&D plan, an immediate and long-term technology innovation plan, focusing on the key production areas and areas with comparative advantages of the enterprise. Innovation activities are a long-term process, so businesses are required to start awareness and investment now to keep up with world trends.

Fifth, businesses need to boldly conduct scientific research and innovative efforts, from operational strategies to production and business practices, build movements and mechanisms to encourage employees to improve innovation capacity, spend a lot of investment in technological innovation to improve productivity and product quality. The most important breakthroughs, creating the highest added value, must be created at the research and design stage to create a difference, product distinction. There is no model for science, technology, and innovation for all businesses. Therefore, the most important thing for each business is to find steps that suit their capabilities, resources, and qualifications.

References:

Draft project (2021): " Development of animal feed processing industry 2021 - 2030 ", Department of Livestock Production, Ministry of Agriculture and Rural Development

https://www.cpgroupglobal.com/en/sustainability/health-living-well/innovation

https://www.cpgroupglobal.com/en/sustainability/sustainability-at-cp- group/cp-group-2030-sustainability-framework-and-goals

https://www.en.krisshakjagat.org/global-agriculture/cargill-wins-2023-big-innovation-award/

https://www.cargill.com/2022/cargill-to-expand-nutrient-research-and-development-capabilities

https://www.wattglobalproducts.com/products/copy-of-worlds-top-feed-companies-2023

https://static.cninfo.com.cn/finalpage/2023-07-15/1217302350.PDF

https://www.researchgate.net/publication/235303263_China's_feed_industry_in_transition_The_case_of_New_Hope_Group_-_an_industry_perspective .

Vietnam Report (2022). Top 10 reputable animal feed companies in 2022.

https://nhachannuoi.vn/147-nha-san-xuat-thuc-an-chan-nuoi-hang-dau-the-gioi-nam-2023-new-hope-chiem-giu-vi-tri-so- first/

PROMOTING DIGITAL TRANSFORMATION IN VIETNAM'S LOGISTICS SECTOR

PhD. Nguyen Thi Hong Yen*

Abstract: ***Digital transformation is an undeniable trend in the era of Industry 4.0. For the logistics sector, digital transformation is not only an opportunity to improve efficiency, save costs, and increase competitiveness, but also a mandatory requirement to adapt to the rapid and unexpected changes of the market. Digital transformation is an inevitable trend and the key to breakthrough for the logistics industry in Vietnam. This article analyzes the potential benefits, challenges to overcome, and proposes some solutions to promote the digital transformation process in the logistics industry, contributing to the strong development of Vietnam's logistics industry, improving its competitiveness, and deeply integrating into the global supply chain.***

• Keywords: *logistics, digital transformation, industry 4.0, Vietnam.*

Date of receipt: 14th December, 2023 *Date of receipt revision: 20th March, 2024*

Date of delivery revision: 25th December, 2023 *Date of approval: 25th March, 2024*

1. Introduction

Digital transformation is an inevitable trend in the era of Industry 4.0. Especially in the context of increasing international integration and promoting the application of achievements of the 4th industrial revolution, digital transformation becomes a key factor to maintain and develop business activities of enterprises. Logistics is the activity of managing, organizing, and coordinating the flow of goods and services from the point of production to the final point of consumption. This field includes transportation, delivery, warehousing, storage, inventory management, order processing, customs procedures, import and export, marketing, sales, and customer service. The logistics industry has contributed to promoting domestic trade and export and plays an important role in the country's economic development.

Logistics is considered the backbone of the supply chain, therefore, the requirements for digital transformation in the logistics industry are also in line with the general trend of the entire economy. In Vietnam, the role of digital transformation in logistics activities is increasingly being paid attention by the Government. According to the plan of the "National Digital Transformation Program to 2025, with a vision to 2030" approved by the Prime Minister, logistics is one of the eight industries that need to be prioritized for digital transformation. Decision No. 200/QD-TTg and 221/QD-TTg of the Prime Minister approving the Action Plan to improve the competitiveness and develop Vietnam's logistics services with a vision to 2045 also sets the task of "researching, applying, transferring technology and technical advances, promoting digital transformation in logistics services" as one of the key tasks to develop Vietnam's logistics industry.

Digital transformation in the logistics sector is the application of digital technologies to logistics activities to improve the efficiency and competitiveness of enterprises. Digital transformation not only helps optimize management, reduce costs, improve efficiency and service quality, but also creates new opportunities for cooperation and collaboration between parties in the supply chain. However, digital transformation in Vietnam's logistics sector still faces many challenges. In recent years, the Vietnamese logistics industry has grown rapidly and achieved many remarkable successes. However, due to the influence of the world situation such as war, inflation, fluctuations in fuel prices, etc., the logistics activities of enterprises are facing many difficulties. According to the World Bank's Logistics Performance Index Survey Report in 2018, Vietnam ranked 39th in the world and 3rd in Southeast Asia in terms of logistics efficiency index (Ministry of Industry and Trade, 2019). However, this index has dropped to 43rd in the logistics performance index ranking (The World Bank, 2023). One of the main reasons is the slow application of information technology in logistics management and operation. Therefore, promoting digital transformation in Vietnam's logistics sector is an extremely important task.

2. Current Status of digital transformation in Vietnam's logistics industry

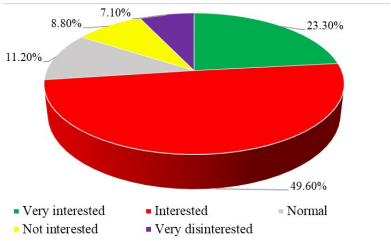
Digital transformation in Vietnam's logistics industry is experiencing positive developments, with the participation of both state management agencies and enterprises. Currently, the Vietnamese government has issued many economic development strategies and regulations to promote the development of the logistics sector and digital transformation in this industry. Decision 749/QD-TTg in 2020 was issued to approve the National Digital

** Thai Nguyen University of Economics and Business Administration; email: nguyenyenkt@tueba.edu.vn*

Transformation Program to 2025, and at the same time identify logistics as one of the eight industries that need to be prioritized for digital transformation (Prime Minister, 2020). This emphasizes the importance of technology application and digital transformation in the logistics sector. The Resolution of the 13th National Party Congress also adopted the Socio-Economic Development Strategy for the 10-year period of 2021-2030, including important orientations and tasks for socio-economic development in the five-year period of 2021-2025. In this Strategy, there is an important part emphasizing the restructuring of service industries based on modern technology and digital technology. In particular, the strategy mentions the development of new types of services and the construction of a service ecosystem in many fields, including finance, banking, insurance, law, healthcare, education and training, telecommunications, IT, as well as logistics and distribution (Central Executive Committee, 2021). This demonstrates the commitment of the Party and State to improving the quality and efficiency of service industries, while promoting digital transformation and socio-economic progress of the country.

Decision No. 221/QD-TTg dated February 22, 2021 of the Prime Minister also identified one of the important tasks to improve the competitiveness and develop Vietnam's logistics services by 2025 as "Researching, applying, transferring technology and technical advances, promoting digital transformation in logistics services" (Prime Minister, 2021). Logistics, as one of the key industries, is highly appreciated for its important role, described as the "bloodstream" of the national economy, and requires strong investment, especially in the field of digitization to meet and adapt to the market context and provide maximum support for the development of other industries.

Chart 1. Level of interest in digital transformation of Vietnamese logistics service enterprises

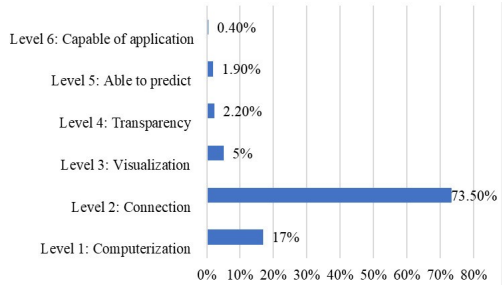


Source: Vietnam Logistics Report 2023 by the Ministry of Industry and Trade

Recognition of the importance of digital transformation and its driving factors is the first crucial step towards the successful implementation of digital transformation solutions within an enterprise. A survey on the level of interest in digital transformation among Vietnamese logistics service enterprises revealed that 23.3% of enterprises are very interested in digital transformation and 49.6% are interested (Ministry of Industry and Trade, 2023).

While many businesses are interested in digital transformation, a small number are still not interested. Specifically, 7.1% of businesses are very disinterested, 8.8% are not interested, and 11.2% are normal. Overall, many logistics service enterprises in Vietnam today have clearly recognized the importance of digital transformation and are accelerating the implementation of digital transformation projects. This has contributed to promoting the demand for digital transformation of logistics service enterprises in Vietnam. However, the level of investment by enterprises in digital transformation is still limited.

Chart 2. Digital transformation level of Vietnamese logistics service enterprises



Source: Vietnam Logistics Report 2023 by the Ministry of Industry and Trade

According to the survey results of the Editorial Board of Vietnam Logistics Report 2023, up to 90.5% of logistics enterprises participating in the survey have achieved a level of digitization, of which 73.5% of enterprises are at level 2 (connection). This shows that Vietnamese logistics enterprises have recognized the importance of integrating data and business processes. However, there are still 17% of enterprises only at level 1 (computerization), meaning that these enterprises only use computers to perform basic tasks. Some businesses have gone further, reaching level 3 (visualization) and level 4 (transparency). Level 3 allows businesses to track business processes in real time, while level 4 helps businesses understand the causes and trends of events in the work. Very few businesses reach level 5 (able to predict) and level 6 (capable of application). Level 5 requires businesses to be able to analyze data and predict future situations, making strategic decisions based on forecasts. Level 6 is the highest level in digital transformation, requiring businesses to be fully adaptable to the continuously changing environment, using data to make quick decisions and automate processes (Ministry of Industry and Trade, 2023).

3. Benefits of digital transformation for the logistics industry in Vietnam

Digital transformation in logistics can bring many benefits to the Vietnamese economy and to both logistics service providers and businesses that need to use logistics services.

Firstly, digital transformation in logistics contributes to optimizing the efficiency of logistics activities, thereby helping to reduce overall logistics costs for the entire economy. This is an important goal for any country,

especially for Vietnam, where logistics costs still account for a high proportion compared to developed countries.

Secondly, digital transformation in logistics helps to improve service quality and enhance customer experience, thereby improving the competitiveness and role of Vietnamese products and services in the global supply chain.

Thirdly, from a state management perspective, when logistics industry data is fully aggregated and updated in real time at high levels of digital maturity, planning, mechanism, and policy decisions will have more reasonable and accurate quantitative bases.

Fourthly, digital transformation helps businesses improve customer experience, especially in terms of information transparency, traceability, and document control. Due to the nature of the logistics industry as a service that affects the goods of other parties, the need to check the status of goods in real time is always a key requirement. Technology solutions, including hardware and specialized software, can help businesses solve this problem, thereby improving the customer experience and creating opportunities for revenue growth.

Fifthly, digital transformation helps businesses optimize performance and strive for business efficiency. The essence of logistics services is to connect many resources at different locations to store and deliver goods to the required destination. Technology applications will play an important role in presenting an overall picture of current demand and resources, allowing operators to make optimal resource plans instead of working in a decentralized manner without technology support.

Sixthly, digital transformation helps to strengthen the connection between departments in the organization. Departments have interrelated tasks and goals, and they can easily grasp them through the information on the system. This will help increase transparency in the organization and optimize the working performance of all members of the organization.

Finally, digital transformation in logistics also brings benefits in terms of sustainable development and environmental protection, specifically reducing carbon emissions by optimizing transportation routes and managing deliveries well based on artificial intelligence applications. This benefit not only brings value to each business in terms of economy and service quality but also has a general impact on the entire logistics industry and the economy (Ministry of Industry and Trade, 2023).

4. Challenges for digital transformation in the logistics sector of Vietnam

For the logistics sector, digital transformation is not only an opportunity to improve efficiency, reduce costs and increase competitiveness, but also a requirement to adapt to market changes and customer needs. However, digital transformation in the logistics sector of Vietnam also faces many difficulties and challenges, which need to be solved promptly and effectively.

Although the awareness of digital transformation in the logistics industry of Vietnam is relatively good, the digital transformation process of the logistics service enterprise community still faces many barriers. The basic barriers include: Limited capital resources

Weak risk management and information security practices; Time-consuming digital transformation; Lack of IT infrastructure; Lack of internal experts; Low IT adoption by customers; Restrictive legal framework; Lack of qualified personnel; Rapid changes in technology and customer needs… Among the barriers for businesses when implementing digital transformation, the capital barrier is considered the biggest. An equally important challenge is ensuring information security and safety. Digital transformation brings many benefits to the logistics sector, but it also carries many risks of information being hacked, stolen, misused or misrepresented. This can have serious consequences, not only affecting the reputation and interests of supply chain participants, but also threatening national and international security. Therefore, raising awareness and responsibility for information security and safety is a key factor in the digital transformation process.

One of the major difficulties is the lack of human resources with technology skills and experience. According to a report by the Vietnam Logistics Association (VLA), currently only about 20% of logistics enterprises use operational management software, while the remaining 80% still use manual or semi-automatic methods. The main reason is the lack of human resources capable of applying and operating modern technological tools. Human resources always play an important role in the sustainable development of the logistics industry in Vietnam. However, at present, the human resources in the logistics industry of Vietnam are facing a shortage in quantity and weak in quality. The logistics industry in Vietnam is facing a serious shortage of IT human resources. Digital transformation requires human resources with IT skills, project implementation and the ability to work in a digital environment. However, the human resources of the logistics industry in general do not have the same technological capacity. In addition, many businesses do not have a specialized IT department or only have a basic technical department. This is a major barrier to the digital transformation of businesses, because there is no department with the capacity to implement digital transformation activities.

5. Some Solutions to Promote Digital Transformation in the Logistics Sector of Vietnam

The digital transformation in the logistics sector in Vietnam has achieved significant milestones. However, alongside these accomplishments, there are still numerous difficulties and challenges to address. To further propel the digital transformation in Vietnam's logistics industry in the coming period, it is essential to implement the following solutions:

The first solution is to build a comprehensive digital logistics ecosystem, connecting stakeholders in the supply chain, from manufacturers, suppliers, carriers, distributors, to end customers. The digital logistics ecosystem will enhance the exchange of information, tracking, and management of goods, improving efficiency and cost savings. The primary strategy entails the establishment of an expansive digital logistics ecosystem, intricately interconnecting all stakeholders within the supply chain. This collaborative network spans from manufacturers and suppliers to carriers, distributors, and culminates with end customers. This comprehensive digital logistics ecosystem is designed to bolster the seamless exchange of critical information, the meticulous tracking of goods, and the proficient management of the entire logistical process. By fostering this interconnected environment, businesses can significantly enhance their operational efficiency, ultimately leading to substantial cost savings. This holistic approach not only streamlines communication and collaboration across the entire supply chain but also introduces a heightened level of transparency and real-time visibility into the movement and status of goods. By leveraging advanced technologies such as IoT (Internet of Things), RFID (Radio-Frequency Identification), and sophisticated tracking systems, businesses can achieve unparalleled accuracy in monitoring inventory, reducing the likelihood of errors, and ensuring a more responsive and agile supply chain.

The second solution is to integrate advanced technologies into logistics operations, such as artificial intelligence, blockchain, the Internet of Things, robots, drones, autonomous vehicles, and more. These technologies will enhance the capabilities and quality of logistics services, creating customizable solutions based on customer needs, minimizing risks, and reducing errors. Logistics enterprises need to clearly understand the role and significance of digital transformation, considering it a core task in the business development strategy. Logistics companies should develop a digital transformation strategy that aligns with the company's actual situation, including the following aspects: Identifying goals and vision for digital transformation; Determining the roadmap for implementing digital transformation; Identifying the necessary resources for digital transformation. Furthermore, logistics enterprises should focus on investing in new, advanced technologies that align with the business's needs. Priority technology investments should include Supply Chain Management (SCM) technology; Internet of Things (IoT) technology; Artificial Intelligence (AI) technology; Blockchain technology, among others. Additionally, logistics companies need to enhance management capabilities, particularly in digital transformation management. Companies should establish a digital transformation management system that suits the business's reality, including: Establishing a digital transformation management department; Developing digital transformation management processes; Providing training and skill development in digital transformation management for employees.

The third solution is to train and enhance the workforce's capabilities in the logistics sector to adopt and operate new technologies, as well as to generate innovative solutions for digital transformation. Additionally, there needs to be a policy to attract and retain talented and experienced individuals in the field. Vietnamese logistics enterprises need to enhance international collaboration to learn from experiences and access new technologies. Relevant organizations, such as the Vietnam Logistics Service Business Association, should support logistics businesses in international cooperation. Related organizations should promote training and human resource development activities for the logistics industry. Training activities should focus on the following aspects: Providing knowledge and skills related to new technologies; Training management skills for digital transformation; Offering language skills training...

The fourth solution is to create a favorable business environment for digital transformation in the logistics sector by refining legal regulations, supporting logistics businesses in investment and technology application, and encouraging collaboration and partnerships within and outside the industry. The government needs to refine policies to support digital transformation in the logistics sector, ensuring coherence and responsiveness to businesses' needs. These policies should focus on the following areas: Supporting logistics businesses in enhancing technological capabilities through training support, technology transfer…; Assisting logistics businesses in developing human resources, including training and skill development support; Facilitating access to funding for logistics businesses, such as providing financial assistance. Simultaneously, the government should create a favorable business environment for digital transformation in the logistics sector, including: Establishing a legal framework for digital transformation, ensuring consistency and uniformity; Creating favorable conditions for logistics businesses to access resources, such as technological infrastructure; Assisting logistics businesses in resolving issues arising during the digital transformation process.

Therefore, the digital transformation in Vietnam's logistics sector is a crucial and necessary step to enhance competitiveness and sustainable development. To achieve this, consensus and collaboration among stakeholders, as well as support from the government and society, are essential.

References:

Central Committee of the Communist Party of Vietnam (2021), Resolution of the 13th National Congress of Delegates, February 1, 2021.

Ministry of Industry and Trade (2019), Guidelines on the Logistics Performance Index (LPI), June 2019.

Ministry of Industry and Trade (2023), Vietnam Logistics Report 2023, Publishing House of Industry and Trade.

Prime Minister of the Government (2020), Decision No. 749/QD-TTg approving the "National Digital Transformation Program to 2025, with a vision to 2030", June 3, 2020.

Prime Minister of the Government (2021), Decision No. 221/QD-TTg amending and supplementing Decision No. 200/QD-TTg dated February 14, 2017 on approving the Action Plan to improve the competitiveness and develop Vietnam's logistics services to 2025, February 22, 2021.

The World Bank (2023), World Bank Releases Logistics Performance Index 2023, available at https://lpi.worldbank.org/report.

Vietnam Logistics Business Association, https://www.vla.com.vn.

ASSESSMENT BANKING SERVICES QUALITY FROM CUSTOMERS SATISFACTION - A VIETNAMESS CASE

PhD. Nguyen Thi Viet Ha*

Abstract: ***The research objective is to use the SERVQUAL model to analyze and evaluate the status of service quality of a Bank branch based on customer satisfaction. Thereby proposing recommendations to improve service quality. Data was collected from a survey with a sample of 157 customers who have been experiencing services at the bank branch in April 2023. The results show that 5 out of 6 factors have a positive and statistically significant impact on the service quality of the Bank, including: reliability, assurance, responsiveness, tangibles, and service attractiveness. Meanwhile, the empathy factor was found to have no effect based on SPSS software data analysis.***

• Keywords: *banking, service quality, satisfaction, SERVQUAL.*

JEL codes: M10, M31, G21

Date of receipt: 02nd January, 2024
Date of delivery revision: 04th January, 2024
Date of receipt revision: 20th March, 2024
Date of approval: 25th March, 2024

1. Introduction

In the context of today's fierce competition, service quality is a crucial factor that helps a bank assert its position against competitors in the market. The satisfaction of customers with the quality of service for each product or service provided is one of the key elements that contribute to the bank's reputation. Specifically, service quality refers to the set of characteristics of an object that gives it the ability to satisfy requirements. It can also be understood as customer satisfaction measured by the difference between expected quality and achieved quality. Service quality is determined based on the perception or feelings of customers when they use the service.

Studies by Jamil (2018), Gabriel & Omigie (2022), and Anas (2019) all indicate a relationship between service quality and customer satisfaction: banks often prioritize Providing better quality banking services to customers to satisfy them. Providing quality banking services is a leading strategic tool of the banking industry today. In Vietnam, research by Cong (2015) affirmed that it is the responsibility of banks to satisfy customers in the best way to retain them.

Service quality significantly contributes to the development of a bank, prompting most banks to focus on improving the quantity and quality of services to satisfy customers. In order to compete with their counterparts, they need to devise specific strategies to establish a system with high-quality services, allowing the bank to retain existing customers and attract new ones. Complementing this trend, banks are also actively seeking and implementing measures to enhance service quality, attract users, and consequently, further develop and secure a solid position in the market. Therefore, this study was conducted to assess the status of service quality from customer satisfaction and propose recommendations for its improvement.

The paper is structured as follows: following the introduction, we develop a model section that establishes the research model based on the service quality model of Parasuraman. Subsequently, we present novel hypotheses regarding the importance of bank quality services, their factors, and offering characteristics, as well as bank quality. Afterward, the methods and results are presented in the third and fourth sections, respectively. The main findings, highlighting the impact of service factors on bank quality, are then discussed, followed by conclusions, along with a set of possible research avenues for investigation by future studies.

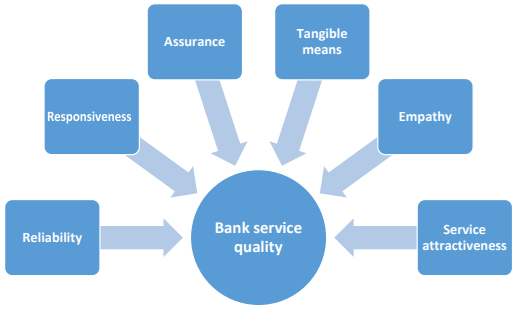
2. Model and hypotheses

According to Parasuraman et al (1985), Service quality is determined based on 5 main components including: (1) Tangible means: expressed through appearance, clothing of employees, through equipment for service. (2) Responsiveness: the desire and willingness of service personnel to provide

* *Banking Academy; email: hantv@hvnh.edu.vn*

services to customers. (3) Empathy: understanding the needs of customers through comprehension of their requirements, providing personal attention, and recognizing regular customers. (4) Credibility: the ability to perform services appropriately and on time from the first instance. (5) Assurance: the ability to ensure the safety of customers, expressed through material and financial safety, as well as information security. To measure service quality from customer satisfaction, based on SERVQUAL, this study proposes a model to evaluate the service quality of the bank specifically, as follows:

Figure 1: Research model



Reliability: Demonstrates the proficiency at which the bank provides services correctly and on time from the first time. According to *Jamil et al. (2018),* reliability is the aspect that has the strongest influence on the quality of a bank's services.

Hypothesis 1 (H1): The better the reliability of the service provided by the bank, the higher the quality of its service, and vice versa.

Responsiveness: The Bank is always willing and willing to provide services to all individuals and organizations. Previous research results by *Gabriel & Omigie (2022)* indicate that service responsiveness has the most impact on user satisfaction. And banks need to focus more on this factor.

Hypothesis 2 (H2): The better the response to the service provided by the bank, the higher the quality of its service and vice versa.

Tangible facilities: An assessment of facilities, equipment, machinery, and uniforms for employees of the bank. The findings of *Mittal et al (2015)* demonstrate that the most important aspect of service quality modeling is tangible means, especially the physical environment that facilitates efficient delivery.

Hypothesis 3 (H3): The more tangible means of the product/service that the bank has, making a good impression on users, the higher its service quality and vice versa.

Guarantee: Demonstrates the bank's level of information security and security. *Main et al (2018)* affirm that it is necessary for bank managers to focus on fundamental aspects of service quality, especially Guarantee, it is necessary to focus on this factor to improve customer satisfaction.

Hypothesis 4 (H4): The better the guarantee of the product/service provided by the bank, the higher the quality of its service and vice versa.

Empathy: The degree to which banks care about user needs. After conducting a survey of 323 customers of Iraqi banks in Baghdad, *Anas (2019)* obtained results indicating that, among the components measuring positive influence on service quality, empathy is more crucial in enhancing customer satisfaction.

Hypothesis 5 (H5): The better the empathy of the service that the bank possesses, the higher the quality of its service and vice versa.

The attractiveness of products/services: special attractive packages in terms of interest rates, fees, priority programs, gifts ... that the bank sends to the user. Harvests from earlier research by *Ruyter et al. (1998)* indicate that incentives in terms of cost, price... have an impact on consumer preferences and customer loyalty when using banking services.

Hypothesis 6 (H6): The more attractive the product/service that the bank launches attract more attention and interest, the higher its service quality and vice versa.

3. Data and measurement

3.1. Sample and setting

Data was collected from the research sample for customers who have been using the services of the bank branch. The minimum sample size required for research analysis of statistically significant regression data is 5*26 variables = 130 observations. The author sent the survey questionnaire to 180 individual customers with a convenient sampling method, who have transactions with April 2023, and collected 157 valid questionnaires. Data is processed and calculated via SPSS ver 25 software. Characteristics of the survey sample obtained are as follows:

Table 1: Sample

Survey criteria	Quantity	Proportion
1. Gender		
Male	86	54.78%
Female	71	45.22%
2. Age		
Under 25	19	12.10%

Survey criteria	Quantity	Proportion
From 25-35 years old	43	27.39%
From 35-45 years old	72	45.86%
Over 45 years old	23	14.65%
3. Occupation		
Merchandising	58	36.94%
Office workers, civil servants	52	33.12%
Farmers and workers	33	21.02%
Students, students	14	8.92%
4. Income		
Less than 10 million	27	17.20%
From 10 - 30 million VND	57	36.31%
From 30 - 50 million VND	50	31.85%
Over 50 million	23	14.65%

Source: Survey results of the authors'

3.2 Measures

Table 2. Results of testing the reliability of the scale

Factor	Observation variables	Cronbach's Alpha coefficient	Total variable correlation
Reliability (TC)	TC1	0.706	0.536
	TC2		0.458
	TC3		0.451
	TC4		0.522
Responsiveness (DU)	DU1	0.738	0.601
	DU2		0.545
	DU3		0.546
Assurance (DB)	DB1	0.737	0.449
	DB2		0.515
	DB3		0.586
	DB4		0.568
Empathy (DC)	DC1	0.739	0.560
	DC2		0.491
	DC3		0.498
	DC4		0.575
Tangible Media (HH)	HH1	0.768	0.601
	HH2		0.492
	HH3		0.494
	HH4		0.499
	HH5		0.610
Service Attractiveness (HD)	HD1	0.700	0.527
	HD2		0.486
	HD3		0.542
Overall Rating (HL)	HL1	0.731	0.540
	HL2		0.586
	HL3		0.540

Source: Analytical data from SPSS of the author team

The author inherited Parasuraman's SERVQUAL scale and questions about service quality to create a questionnaire to survey the service quality status of the bank. The hypothetical design of the questionnaire with 26 variants representing the characteristics of 7 evaluation factors: Reliability (TC1 - TC4); Responsiveness (DU1 - DU3); Assurance (DB1-DB4); Tangible means (PT1-PT5); Empathy (DC1-DC4); The attractiveness of the product/service (HD1-HD4); Service quality assessment (HL1-HL3).

Scale reliability

From the results of the calculation, we conclude: Cronbach's Alpha is both greater than or equal to 0.7, the scale is qualified, and in column Alpha there is no situation where the removal of the observed variable would make Cronbach's Alpha of this scale better. The total variable Correlation value of all variables is greater than 0.3. Thus, all the above variables are retained.

4. Data analysis and results

The collected data will be aggregated into excel, remove invalid votes, and put into analysis by methods such as: Cronbach's Alpha, descriptive statistics, scale reliability testing, EFA analysis, Pearson test, regression... on SPSS ver 25 software.

4.1. EFA Analysis Results

At the first EFA analysis, a KMO = 0.813 is guaranteed to be higher than 0.5 and less than 1; Sig = 0.000 < 0.05; The 7 extracted factors have an Eigenvalue of ≥ 1 with a total extraction variance of 80.278% > 50%. That suggests the model is appropriate. However, at this same analysis, at the rotation matrix table, 1 bad variable was found to be DC4 due to a load factor lower than 0.5.

The second EFA analysis, after conducting the variable type DC4, KMO = 0.805 > 0.5; Sig = 0.000 < 0.05; The total variance extracted is valued at 81.567% > 50%. Inferred, the model is appropriate. As the rotation matrix, it is found that a bad variable is DB1 with a load factor < 0.5.

For the third analysis, KMO = 804; Sig = 0.000; The 6 criteria extracted have Eigenvalue ≥ 1**;** The total cumulative variance extracted is equal to 78.882% => All indicators satisfy the condition, the model is suitable.

After the previous two variable eliminations, the remaining 21 variables were divided into 6 factors, namely: Attractiveness (HD1, HD2, HD3), Tangible (HH1, HH2, HH3, HH4, HH5), Reliability (TC1, TC2, TC3, TC4), Empathy (DC1, DC2, DC3), Responsiveness (DU1, DU2, DU3), Assurance (DB2, DB3, DB4).

4.2. Pearson Correlation Analysis

**Correlation analysis between independent variables:*

Which pair of independent variables DB and HD has Sig < 0.05 and Pearson correlation coefficient greater than 0.4, so there is doubt about linear multi-additiveness in this pair. Later, when

analyzing regression, it is necessary to consider the VIF coefficient at these two variables to consider elimination.

** Correlation analysis between dependent variables and independent variables:*

According to the above matrix, the Sig coefficient between the dependent variable HL and the independent variables TC, DC, DU, DB, HH, HD are all less than 0.05, meaning that there is a correlation between those pairs of variables. As such, it is suitable for performing regression analyses.

Table 3: Pearson correlation results

Correlations								
		HL	TC	DU	.DB	DC	HH	HD
HL	Pearson	1	.624**	.796**	.669**	.485**	.626**	.518**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
TC	Pearson	.624**	1	.622**	.627**	.539**	.773**	.584**
	Sig. (2-tailed)	.000		.978	.908	.493	.184	.007
DU	Pearson	.796**	.622**	1	.659**	.484**	.621**	.514**
	Sig. (2-tailed)	.000	.978		.846	.475	.004	.676
.DB	Pearson	.669**	.627**	.659**	1	.564**	.633**	.627**
	Sig. (2-tailed)	.000	.908	.846		.542	.978	.000
DC	Pearson	.485**	.539**	.484**	.564**	1	.565**	.607**
	Sig. (2-tailed)	.000	.493	.475	.542		.894	.857
HH	Pearson	.626**	.773**	.621**	.633**	.565**	1	.652**
	Sig. (2-tailed)	.000	.184	.004	.978	.894		.879
HD	Pearson	.518**	.584**	.514**	.627**	.607**	.652**	1
	Sig. (2-tailed)	.000	.007	.676	.000	.857	.879	

Source: Analysis results of the authors' team

4.3. Regression analysis

The first regression found:

The Model has R squared correction = 0.891 shows that the independent variables included in the regression analysis affect 89.1% of the dependent variable's variability. ANOVA table: Sig = 0.00 < 0.05, so the linear regression model is suitable for the data set and usable.

Table of detection regression coefficients: the DC variable has a test Sig t = 0.679 > 0.05, so the DC variable has no effect on the dependent variable HL => Remove the DC variable or otherwise refute hypothesis 5 (GT5): "*The better the empathy of the SPDV that the bank possesses, the higher its CLDV and vice versa"* . The remaining independent variables: TC, DU, DB, HH and HD all have Sig tests t < 0.05, so assumptions corresponding to these variables are accepted. Also in this table, the VIF of each independent variable is less than 2, so the model is unlikely to have linear multiadditiveness.

The second regression, after eliminating the DC variable, obtained the following result:

Table 4: Regression results

Regression coefficient								
Model		Unnormalized regression coefficient		Normalized regression coefficient	t	Sig.	Linear multi-plus statistics	
		B	Standard deviation	Beta			Acceptance	VIF
1	Constants	-.029	.036		-.804	.422		
	TC	.110	.039	.100	2.852	.005	.841	1,622
	DU	.939	.015	.943	61.470	.000	.913	1,692
	.DB	.081	.020	.073	4.100	.000	.856	1,401
	HH	.146	.045	.130	3.231	.002	.931	1,298
	HD	.050	.017	.049	2.883	.005	.872	1,825
a. Dependent Variable: HL								

Source: Analysis results of the authors' team

The regression equation is obtained:

HL = 0.1*TC + 0.943*DU + 0.073*DB + 0.130*HH + 0.049*HD

From the above analysis results, 5/6 factors: TC, DU, DB, HH, HD have a positive and statistically significant impact on the service quality of the Bank with 95% reliability. In that, Responsiveness (DU) has the greatest impact, followed by Tangible Medium (HH), Reliability (TC), Assurance (DB), and Attractiveness (HD), respectively. The results of the study are like those of *Gabriel & Omigie (2022)* when the same shows that similarities have the greatest impact in the criteria for measuring service quality.

This study found that the DC variable had a positive impact on 's service quality but was not statistically significant. This shows that for customers participating in this survey, DC has an impact on service quality at the bank but cannot infer this result for all other customers. The results of this study differ from the research of *Anas (2019*) and *Gabriel & Omigie (2022)* earlier in making an assertion more focused on empathy to increase the satisfaction of the customer.

5. Conclusions and recommendations

The research results have shown that service quality is largely influenced by five factors: responsiveness, tangible means, reliability, assurance, and attractiveness of service. This serves as a foundation for the bank to consider in the process of formulating strategies towards improvement and enhancement of service quality.

Based on these results, the author presents some implications for managers and employees as follows: For administrators, prescribing a consistent working process, fostering proper awareness of the role and goals of improving service quality, and focusing on

understanding the needs of customers are crucial in developing optimal plans and policies to enhance the customer experience. For employees, it is essential to actively learn and refine service skills in communication, provide advice to customers for skill and knowledge improvement, and maximize individual work performance.

First, *improve the quality of human resources.*

According to the analyzed statistical results, most customers provided positive feedback on the dedication and attitude of the staff. However, the bank should not neglect or overlook this aspect; instead, there is a need for continuous improvement, focusing on enhancing the bank's prestige, creating a positive impression at the branch, and expanding the loyal customer base, aiming for long-term customer service. To achieve this goal, employees should engage in continuous learning by participating in training programs provided by the Headquarters. Additionally, organizing regular counseling and skill training sessions on new operations and products at the branch is essential. Leadership plays a crucial role in ensuring that the right individuals are assigned to the appropriate positions, and the workload in each department is distributed fairly to allow all employees to maximize their strengths. Each employee should also take the initiative in self-learning and training skills such as patience, concentration in work, and effective consultation and persuasion techniques.

Second, *improve the quality of facilities.*

Based on the stated statistical results, tangible factors, such as physical amenities, have a positive impact on consumer satisfaction. Therefore, to enhance satisfaction with bank services and increase brand awareness in the near future, the bank needs to pay further attention to: Choosing the locations of transaction points reasonably, allowing them to reach a large number of users and providing sufficient space for comfortable design and construction in convenient departments and areas; Decorating the waiting area and rearranging areas and departments according to each function at the transaction office is necessary

Third, *research to understand the needs of customers*

The key to fostering customer loyalty and promoting competitive attraction for banks is to make customers love and stick. This can be achieved by: Focusing more on users and offering gratitude support programs, including reducing or waiving some fees; The Board of Directors, as well as branch employees, need to regularly pay attention to customer needs to identify ongoing issues at the branch. Conducting surveys and measuring customer satisfaction will allow for objective feedback from customers, helping the branch understand the desires of each target group. This information can be used to promptly address complaints and points of dissatisfaction. Simultaneously, it aids in determining a more suitable service development direction.

However, this study is not immune to certain limitations. *Firstly*, there are numerous factors influencing the quality of translations in the case of a bank that this study does not cover. *Secondly*, the survey time was short (conducted in April 2023), and the number of cooperative customers participating in interviews was not high, resulting in a limited number of valid votes collected (n=157). Consequently, drawing the most objective and accurate conclusions may be challenging. To gain a more comprehensive assessment from various perspectives, it is essential to expand the survey size, sample size, and duration. This recommendation stands as a suggestion for future research on similar topics.

Declarations

Availability of data and material: All data generated or analyzed during this study are included in this published article.

Competing interests: The authors declare that they have no competing interests.

Funding: No funding was obtained for this study.

References:

Anas, S. A. (2019). The effect off customer satisfaction on service quality: The case of Iraqi banks. International Journal of Applied Research, 5 (1), 146-152.

Hammoud, J., Bizri, R. M., & El Baba, I. (2018). The impact of e-banking service quality on customer satisfaction: Evidence from the Lebanese banking sector. Sage Open, 8(3), 2158244018790633.

Kubeyinje, G. T., & Omigie, S. O. (2022). The Influence Of Service Quality Dimensions On Customer Satisfaction In The Nigerian Banking Industry. Oradea Journal of Business and Economics, 7(special), 67-76.

Main, N. A. (2018). Banking service quality provided by commercial banks and customer satisfaction. A structural equation modelling approach. International Journal of Productivity and Quality Management, 24(4), 543-565.

Mittal, S., Gera, R., Batra, DK. (2015). An evaluation of an integrated perspective of perceived service quality for retail banking services in India. International Journal of Banking Marketing, 33(3), 330-350.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. Journal of marketing, 49(4), 41-50.

Ruyter, K., Martin, W., Josée B. (1998). On the relationship between perceived service quality, service loyalty and switching costs. International Journal of Service Industry Management, 9(5), 436-453.

Thanh, N. C. (2015). Models for measuring the quality of banking service. Journal of Development and Integration, 20(30), 43 - 54.

CURRENT SITUATION OF BAD DEBT OF VIETNAM COMMERCIAL BANKS AND RECOMMENDATIONS TO STATE MANAGEMENT AGENCY

PhD. Vu Ngoc Diep* - MA. Vu Quynh Anh*

Abstract: ***This article studies bad debts and provides recommendations to state agencies on handling bad debts of commercial banks in Vietnam for the period 2018-2022. To achieve the research goal, the authors utilized data from 15 commercial banks with relatively accurate data, ranging in scale from small to large, and accounting for 62.9% of the total assets of the commercial banking system, thereby representing almost the entire system.***

• Keywords: *bad debt, bad debt ratio, credit balance.*

Date of receipt: 25th December, 2023

Date of delivery revision: 27th December, 2023

Date of receipt revision: 20th February, 2024

Date of approval: 21th March, 2024

1. Viewpoints on bad debt

The viewpoint on bad debts by the International Monetary Fund (IMF) is as follows: 'Bad debts are debts with interest and/or principal that are overdue for 90 days or more. Interests that are overdue for 90 days or more are refinanced or have debt repayment postponed as agreed. Additionally, debts that are overdue for less than 90 days but show other signs that the borrower is unable to fully pay principal and interest are also considered bad debts.

The Institute of International Finance proposes to classify debt into 5 groups, including: (1) Standard debt: Debt with due principal and interest, showing no signs of difficulty in payment. Debt settlement and forecast indicate the ability to pay principal and interest on time and in full as committed; (2) Debts that need attention (Watch): Debts in a situation where, without measures, the risk of not fully paying principal and interest may increase. This is debt that requires more attention than usual; (3) Substandard debt: Debt with doubtful ability to fully pay principal and interest as committed, or principal and/or interest overdue for more than 90 days, or collateral assets have decreased in value, leading to the risk of loan value reduction if not handled promptly; (4) Doubtful debt: Debt determined to be unable to fully recover the principal and interest under current conditions or the interest and/or principal are overdue for more than 180 days. Debt in this group has been reduced in value but has not completely lost capital because there are still factors identified that can impact debt quality improvement; (5) Loss debt: Debt assessed as irrecoverable or the principal and/or interest is overdue for more than 1 year. Accordingly, bad debt includes debt from the last 3 groups.

International accounting standards (IAS) define bad debt and are currently commonly applied worldwide. According to these standards, "Bad debts are debts that are overdue for interest and/or principal payments for more than 90 days and have a worrying ability to repay".

The State Bank of Vietnam introduced the concept of bad debt in Circular No. 02/2013/TT-NHNN dated January 21, 2013: "Bad debt is debt in groups 3, 4 and 5 including subprime debt, doubtful debt, irrecoverable debts"

Bad debt ratio (%) = Bad debt balance / Total outstanding debt * 100

This indicator reflects how many VND in 100 outstanding debts are bad debt (or how many percent of the total outstanding debt is at risk).

Bad debt is an unavoidable issue in bank credit activities, making it crucial for commercial banks to keep the bad debt ratio at the lowest acceptable level. According to the World Bank, an acceptable rate is less than 5%, with a range considered good being 1% to 3%. Both theory and experimental studies show that this ratio is positively related to NIM.

2. The current situation of bad debt at Vietnamese commercial banks

The bad debt ratio is a crucial financial indicator used to assess the credit quality of Vietnamese commercial banks. A high bad debt ratio in a commercial bank indicates that credit activities, particularly lending, are of low quality and pose a high risk, necessitating a comprehensive review of all credit operations. Despite being an inevitable challenge in credit activities, it is essential for banks to maintain this ratio at an acceptable level. According to the World Bank, an acceptable rate is less than 5%, with 1-3% considered good. Currently, the average bad debt ratio of Vietnamese commercial banks stands at 1.81%, with a high standard deviation of 0.81%. The range between the smallest value (0.47%) and the maximum value (5.42%) is substantial, highlighting significant variations in credit risks among banks.

** Thuongmai University; email: vungocdiep@tmu.edu.vn - vuquynhanh@tmu.edu.vn*

Table 1: Bad debt of 15 Vietnamese commercial banks from 2018-2022 (Billion VND)

STT	Tên ngân hàng	2018	2019	2020	2021	2022
1	Agribank	16083	17846	21527	25535	26064
2	BIDV	18802	19496	21369	13546	17622
3	Vietcombank	6223	5370	5230	6121	7808
4	Vietinbank	13709	10813	9519	14300	15796
5	ABBank	984	1312	1324	1617	2366
6	ACB	1675	1449	1840	2799	3045
7	Eximbank	1921	1933	2534	2247	2347
8	LienVietPostBank	1680	2030	2527	2778	3426
9	MBBank	2860	2898	3248	3268	5030
10	NamA Bank	785	1334	744	1613	1611
11	Techcombank	2803	3078	1295	2294	3818
12	VPBank	7766	8798	9924	15887	25137
13	Kienlong Bank	278	342	1883	726	845
14	NCBank	596	730	609	1249	8556
15	PGBank	675	749	626	626	745

Source: Annual reports of commercial banks (2018-2022)

Table 2: Bad debt ratio of 15 Vietnamese commercial banks from 2018-2022 (%)

STT	Bank name	2018	2019	2020	2021	2022
1	Agribank	1,60	1,59	1,78	1,94	1,81
2	BIDV	1,90	1,75	1,76	1,00	1,16
3	Vietcombank	0,98	0,73	0,62	0,64	0,68
4	Vietinbank	1,59	1,16	0,94	1,26	1,24
5	ABBank	1,89	2,31	2,09	2,34	2,88
6	ACB	0,73	0,54	0,60	0,78	0,74
7	Eximbank	1,85	1,71	2,52	1,96	1,80
8	LienVietPostBank	1,41	1,44	1,43	1,37	1,46
9	MBBank	1,33	1,16	1,09	0,90	1,09
10	NamABank	1,54	1,97	0,83	1,57	1,35
11	Techcombank	1,75	1,33	0,47	0,66	0,91
12	VPBank	3,50	3,42	3,41	4,57	5,73
13	KienlongBank	0,94	1,02	5,42	1,89	1,89
14	NCBank	1,67	1,93	1,51	3,00	17,93
15	PGBank	1,54	1,97	0,83	2,28	2,56

Source: Annual reports of commercial banks (2018-2022)

According to statistical data from banks' financial reports in 2022, despite the heavy impact of the epidemic on various economic sectors, including the banking and finance industry, the bad debt ratio for most banks generally decreased. However, there were exceptions, notably VPBank and NCBank, which experienced significant increases, and ABBank and PGBank, which saw more moderate increases. Particularly alarming is the case of NVBank, where the bad debt ratio surged from 3% in 2021 to 17.93% in 2022 - an alarming increase of seven times.

As of December 31, 2022, banks maintained control over the bad debt ratio, keeping it below 3%. However, despite the decrease in the bad debt ratio, the absolute number of bad debts held by commercial banks increased. This was attributed to the higher growth rate of outstanding loans compared to bad debts. In 2020, state-owned banks successfully maintained a bad debt ratio below 3%. Specifically, among the 35 Vietnamese commercial banks, Vietcombank and Vietinbank were two of the six banks with a bad debt ratio of less than 1%. Vietcombank reported a low bad debt ratio of 0.68% in 2022, while Vietinbank's ratio remained at 1.24%. In addition, during 2022, Vietinbank successfully resolved all bad debts at the Asset Management Company (VAMC), leading to improvements in the loan bad debt coverage ratio and on-balance sheet bonds, increasing to 130% compared to 1.16% in 2022. BIDV's bad debt ratio in 2022 reached 1.16%, a slight increase of 0.02% compared to 2021, despite the notable increase in the bad debt figure to 1,496 billion VND. BIDV's bad debt ratio for 2022 is expected to show a slight increase compared to 2021; however, this increase is not considered significant due to the sound business operations and strong national brand of state-controlled banks. Each of these companies holds a portfolio of customers that have demonstrated excellent performance over the past several years.

Within the category of private commercial banks, only two banks - ACB and Techcombank - maintain bad debt ratios below 1%, reporting 0.74% and 0.91% respectively in 2022. Most private commercial banks in 2022 exhibit bad debt ratios below 2% or 3%, with only VPBank and NCBank standing out with high ratios exceeding 3%. Over the period from 2018 to 2022, MBBank achieved its lowest bad debt ratio in 2021 in the decade spanning from 2011 to 2021. In 2021, MBBank also made substantial provisions, resulting in a Loan Loss Reserve (LLR) ratio of 134%, the highest level since 2011. When considering the entire banking system, VPBank and NCBank emerge with the largest bad debt ratios at 5.73% and 17.93% respectively. This is attributed to VPBank's subsidiary, FEcredit, which not only contributes to profits but also adds to the bad debt for VPBank. NCBank experienced a significant increase in bad debt in 2022, largely due to 1,882 billion VND in outstanding loans to a group of customers whose collateral assets were Sacombank's STB shares, categorized in group 5 as debt with potential loss of capital.

What is noteworthy for banks in 2022 is that, although the bad debt ratio has almost decreased, there has been a notable increase in debt that needs attention (group 2 debt), particularly evident in Vietcombank with a 70% surge. This is a matter of concern because if customers continue to be unable to repay their debts, these debts may transition from group 2 to the bad debt group. Additionally, debt in groups 4 and 5 exhibited a sharp increase compared to previous years during the study period. A striking example is NamABank, a bank with a bad debt ratio of less than 1%, where the total bad debt decreased by 44% to 744 billion VND in 2022, but group 5 debt increased by 77% compared to 2021, reaching nearly 468 billion VND. Meanwhile, at BIDV, group 5 debt increased by more than 5,000 billion VND, reaching 16,525 billion VND, equivalent to a 46% increase compared to the beginning of the year. MB's total bad debt stands at nearly 3,248 billion VND, with group 5 debt increasing by 124%, accounting for 1,384 billion VND. Moreover, although the bad debt ratio at many banks has remained at a low level for many years, the bad debt figure does not fully reflect reality, as many debts have had their repayment terms restructured according to Circular 01/2020/TT-NHNN, essentially classifying them as bad debt.

In 2022, banks also allocated a significant amount to provision for risk reserve funds, addressing issues related to

bad debts. This expenditure was partially utilized by banks to write off bad debts in the fourth quarter of 2022, with the aim of reducing the overall bad debt ratio for the entire year. Another portion of these funds is designated for making provisions for potential bad debts in the future, particularly in the context of maintaining the same debt group for customers affected by the COVID-19 epidemic, as stipulated in the expiring Circular 01/2020/TT-NHNN. Specifically, in 2022, the debt was restructured and the repayment term according to this circular amounted to 355,000 billion VND, representing about 4% of the total outstanding debt in the economy. Consequently, if only 50% of the restructured debt were to turn into bad debt, the bad debt ratio for the entire system would increase to 4%. The overall strategy of banks involves making early provisions for risks in 2022 as a preemptive measure to alleviate potential challenges in the future, especially considering the prolonged and uncontrolled nature of the epidemic. However, this approach introduces another challenge: it may become challenging for banks to lower lending interest rates. Inadvertently, a portion of the cost associated with handling bad debt may be indirectly transferred to the borrower.

3. Assessment of bad debt and bad debt management of Vietnamese commercial banks today

Although Vietnamese commercial banks have achieved certain achievements in their efforts to reduce bad debt, in the process of implementing bad debt handling, there are still some difficulties and challenges:

Firstly, Vietnamese commercial banks are currently addressing bad debt by establishing risk provisions and selling debt to VAMC (Vietnam Asset Management Company) to obtain special bonds. Other measures, such as handling collateral assets and debt collection from customers, are still at a low level. When selling debt to VAMC, bad debt persists because the rights and obligations related to the debt of the lender and the borrower have not concluded. After selling the debt, the bank must make a provision of 20% each year, forming the basis for completing the special bond settlement at VAMC, as announced. Subsequently, banks receive back a significant amount of assets but continue to face challenges in debt recovery. This process is time-consuming and costly, as a series of mortgaged real estate assets, ranging in value from several billion dong to thousands of billion dong, are still being auctioned by banks without finding buyers. Therefore, while on-balance sheet bad debt has decreased, off-balance sheet debt remains high, leading to an incomplete resolution of bad debt issues in Vietnamese commercial banks. Additionally, the costs associated with credit risk provisions and special bond provisions are deducted from the bank's profits. If this situation persists, the bank's business results in the following years may be adversely affected, making it challenging for the bank to increase its charter capital.

Secondly, following the credit process, to utilize risk provisions for addressing bad debts, banks must first implement measures to recover customer debts and apply support measures such as restructuring repayment terms or loan restructuring. Only after these initial steps can banks then use risk provisions, including selling collateral, to recover debt and address bad debts in Group 5 or debts related to dissolved or bankrupt customers, including those who are missing or deceased.

Third, the seizure of collateral is encountering challenges as customers are not cooperating in surrendering assets. Additionally, the authorities (State Committee, police agency, etc.) have not actively coordinated and participated in providing support to address difficulties for the bank. Communication difficulties further complicate the process of confiscating assets, hindering the spirit of Resolution 42/2017/QH14.

Fourth, although the bad debt ratio in 2020 is low, there is a noticeable increase in debt within groups 4 and 5. Simultaneously, debt requiring attention (group 2) has also experienced a sudden rise. In the event that customers are unable to repay the debt, group 2 debt will be transferred to the bad debt group. Specifically, according to statistics, the restructured debt with a repayment term according to Circular 01/2020 amounts to 355,000 billion VND, representing 4% of the total outstanding debt of the economy in 2020. Therefore, if only 50% of the restructured debt becomes bad debt, the bad debt ratio for the entire system will increase to 4%. The fact that Vietnamese commercial banks made early provisions for credit risks in 2020 is a solution to alleviate pressure for potential difficulties and challenges in the future. However, this solution creates another problem: it will be challenging for banks to lower lending interest rates. In essence, part of the cost of handling bad debt has to be borne by customers.

As old debts remain unresolved, new difficulties have gradually surfaced. While Techcombank, with the second-lowest bad debt ratio in the banking system after ACB, saw a 58% decrease in total bad debt, group 4 debt increased by 75%, reaching nearly 534 billion VND. NamABank, also within the group of banks with a bad debt ratio of less than 1%, experienced a 44% decrease in total bad debt to 744 billion VND. However, group 5 debt increased by 77% compared to the beginning of the year, totaling nearly 468 billion VND. The bank's accrued interest also surged by 100% in 2020, reaching 2,632 billion VND. At BIDV, group 5 debt increased by more than 5,000 billion VND, reaching 16,525 billion VND, equivalent to a 46% increase compared to the beginning of the year. MB's total bad debt stands at nearly 3,248 billion VND, of which group 5 debt increased by 124%, accounting for 1,384 billion VND. In particular, debt requiring attention (group 2) at the end of 2020 in some banks showed a sudden increase. OCB increased by 118%, VIB skyrocketed by 76%, and Vietcombank increased by 70%. This is also a matter of concern because if customers continue to be unable to repay their debts, these debts will transition from group 2 to the bad debt group. In 2020, banks

also set aside a substantial amount for risk reserve funds in response to the bad debt problem. The risk provision costs reserved in 2020 were partly used by banks to write off bad debts in the fourth quarter, aiming to reduce the bad debt ratio for the entire year. Partly, these funds were allocated for making provisions for potential bad debts that may arise in the future, especially as regulations on restructuring and maintaining the same debt group are required to support customers affected by the Covid epidemic, according to Circular 01/2020/TT-NHNN, which is no longer valid. Because the 355,000 billion VND of debt restructured and repaid according to Circular 01 in 2020 accounts for about 4% of the total outstanding debt of the economy, if only 50% of the restructured debt turns into bad debt, the bad debt ratio for the entire system will increase to 4%. Early provisioning is a solution to reduce pressure from potential difficulties and challenges in the future, and it is a common practice among many banks. However, this solution creates another significant problem: it will be challenging for banks to lower lending interest rates, as part of the cost of handling bad debt falls on the borrower.

4. Some recommendations for state management agencies

Firstly, improve the capacity to handle bad debts for VAMC

For VAMC to truly operate effectively, the State Bank needs to focus on the following solutions: (1) Assign sufficient authority to VAMC along with a designated budget source, associated with a specific deadline, to effectively handle high levels of bad debt. (2) Ensure that the process of handling bad debts aligns with the restructuring of businesses, especially State-Owned Enterprises (SOEs). (3) Establish a specialized trading floor to enhance liquidity in the debt trading market. (4) Develop a comprehensive legal framework for the market, facilitating the buying, selling, and handling of bad assets. (5) Issue debt valuation standards to provide a legal basis for implementation once the Debt Trading Exchange is operational.

Secondly, improve the quality of CIC credit center operations

For CIC to become a reliable data repository and mitigate risks for the entire commercial banking system, CIC needs to: (1) Innovate and modernize equipment to establish a system for smooth and prompt collection and provision of credit information, ensuring banks always receive quick and accurate data. (2) Recruit and train CIC network management staff with expertise not only in information technology but also in collecting, analyzing, synthesizing, and offering suitable comments and warnings for commercial banks to reference. (3) Implement regulations mandating commercial banks to cooperate and provide complete information to the center. (4) Conduct rigorous inspections of reporting and information exploitation by banks, and take resolute and timely measures against those violating the credit information reporting regime. (5) Develop CIC into a larger, centralized database center for all banks and expand credit rating and credit risk assessment services based on that.

Thirdly, strengthen inspection and supervision of the banking system

The State Bank and inspection and supervision agencies should focus on inspection, examination, and supervision activities in terms of both breadth and depth. In-depth measures include continuous innovation in banking inspection and supervision, adopting new technology for ongoing monitoring, and addressing potential risks and legal violations. Broad measures involve intensive inspection in areas prone to risks and law violations, such as lending processes and risk management. Post-inspection supervision should include additional and corrective actions based on inspection conclusions.

Fourth, clearly stipulate the time for handling bad debts of credit institutions

To expedite the handling of bad debts and ensure early capital recovery, the State Bank should establish specific regulations without limiting the time frame for debt resolution. If the time limit is exceeded, debts should be sold at the price determined by an intermediary appraisal organization. Addressing the obstacle of limited capital for the debt trading company is crucial.

Fifth, implement measures to strengthen prevention, control, and overcome Difficulties caused by the impact of the Covid-19 epidemic

Considering the impact of the COVID-19 epidemic, policy recommendations include: (1) Exercising caution in loosening financial safety regulations, adjusting debt classification, and safety ratios during specific times and contexts to enhance the economy's capital supply. (2) Providing more specific and long-term policy directions for businesses, individuals, and credit institutions to facilitate long-term planning and operations.

References:

Dang Thi Lan Phuong, Nguyen Thanh Phuong, Factors affecting the bad debt ratio of commercial banks with shares traded on the Vietnam stock exchange ngân hàng thương mại có cổ phiếu giao dịch trên sàn chứng khoán Việt Nam, Journal of Banking Science & Training - No. 260+261 - January & February. 2024.

Aburime (2009), Determinants of Bank Profitability: Company Level Evidence from Nigeria, Online at ScienceDirect.

Le Duy Khanh (2023). Factors affecting credit risk: the case of Vietnamese commercial banks. Ho Chi Minh City Open University scientific journal. Doi:10.46223/HCMCOUJS.econ.vi.18.2.2198.2023

Luong Huu Phuc, Le Nguyen Dan Khoi (2021). Factors affecting the credit performance of Vietnam Joint Stock Commercial Bank for Investment and Development - Southwest branch. Journal of scientific research and economic development of Tay Do University, number 13/2021.

Annual reports, financial statements, and balance sheets for the period 2015-2022 of the banks in the research sample.

Nguyen Kim Phuoc, Phan Ngoc Thuy Nhu, Ngo Thanh Trung (2018). Impact of internal factors on bad debts of commercial banks. Ho Chi Minh City Open University scientific journal. Doi:10.46223/HCMCOUJS econ.vi.13.2.1613.2018 Nguyen Thi Anh Hoa. (2021). Factors affecting bad debt of Vietnamese commercial banks. School Science Magazine.

Nguyen Thi Nhu Quynh (2020). Factors affecting bad debt at Vietnamese commercial banks. Ho Chi Minh City Open University scientific journal. Doi: 10.46223/HCMCOUJS.econ.vi.13.3.524.2018

Nguyen Thi Hong Vinh (2017). Bad debt of Vietnam's commercial banking system. Doctoral thesis in economics, Banking University, Ho Chi Minh City.

EXPLORING THE DETERMINANTS OF DIGITAL BANKING: PERSPECTIVE ON BARRIERS TO CHANGE

Nguyen Thi Huong Lan*

Abstract: ***Digital transformation is an important trend for business development in the Fourth Industrial Revolution and is an irreversible trajectory. The development of digital banking is, therefore, an inevitable trend. However, the transformation process from traditional banks to digital banks in Vietnam is still very new and faces numerous barriers. Based on the Technology-Organization-Environment (TOE) model, this study proposes a hierarchical model that includes three main dimensions and eleven sub-dimensions to assess the barriers affecting the digital transformation of banks in the emerging market. The Analytical Hierarchy Process (AHP) is used to rank relative comparisons to uncover the determinants of digital transformation adoption for commercial banks in Vietnam. The results show that the relative importance of technological barriers is the largest (0.574), followed by organizational barriers (0.290) and environmental barriers (0.136). These results imply that to gain a relative competitive advantage, banks should focus on removing technological barriers, providing support resources for digitalization, and preparing strategies to deal with the complexity of technology and the operating environment.***

• Keywords: *digital transformation, TOE model, digital banking, AHP.*

JEL codes: G21, L24

Date of receipt: 12th December, 2023 *Date of receipt revision: 05th February, 2024*

Date of delivery revision: 29th December, 2023 *Date of approval: 05th March, 2024*

Introduction

The passage discusses the concept of digital banking, which involves the transformation of traditional banking activities through digital platforms. It emphasizes the competitive advantage that commercial banks can gain by leveraging information technology to serve customers more effectively. With the rapid development of technology, especially in the context of Industry 4.0, modernizing products and services becomes essential for banks to enhance their competitiveness. Consequently, there's a pressing need for digital transformation aligned with both customer demands and the bank's capabilities. Despite considerable efforts by banks to invest in technology and improve customer experiences over the past few decades, challenges persist, including the rapid development of digital technology scenes and intensifying competition in the financial market. In Vietnam, the increasing number of internet and smartphone users presents opportunities for commercial banks to digitize their operations. However, the digital transformation in Vietnamese banks is still in its early stages and faces various challenges, such as the swift evolution of the digital technology landscape and fierce market competition. Thus, evaluating and prioritizing barriers affecting digital transformation decisions is deemed necessary for optimal solutions.

1. Research overview

1.1. Research background

Over the past few decades, there has been no denying the efforts of banks to invest in technology to improve customer experience (Kaur et al., 2021). This is a consequence of both objective and subjective causes. The 4.0 technology era with the explosion in the number of internet users, the increase of smartphone users, and the appearance of social networking sites is a premise for the development of digital banking. Along with that, the perception of cost efficiency, transaction speed, convenience and profitability have motivated banks to implement digital transformation. Moreover, the actual implementation of digital banking is noted to reduce operating costs by about 20-25% and thus increase the competitive advantages of banks. However, this reduction in operating costs has not yet met the expectations of banks as they have to deal with technical problems when moving customers from traditional channels to digital channels (Sarel and Marmorstein; 2002).

With this potential, the development of digital banking in Vietnam has a lot of potential and advantages. To keep pace with the industrial revolution 4.0, developing digital banking has become the business strategy of many banks (Nguyen T. T. et al., 2020) to increase market share and find a sustainable foothold in the financial market. However, digital banking in Vietnam is still in the early stages of development and is still quite new, especially for customers who have used traditional banking services for a long time and have not yet adapted to technology applications. Along with that, the hasty development of the digital technology scene in Vietnam and the increasingly fierce competition in the financial market have posed many challenges for Vietnamese commercial banks.

** VNU University of Economics and Business, Vietnam National University, Ha Noi; email: Lannth@vnu.edu.vn*

This study stands on the perspective of the subject who directly implements the digital transformation of banking services to find out what barriers and how much influence those barriers have on the process of bank digitization.

1.2. Theoretical background and research overview

Digital transformation is the transition from a traditional business model to a digital business model based on digital transformation techniques and the application of new technologies (Siebel, 2019). Digitization is "the use of digital technologies to transform business models and provide new revenue and value creation opportunities; it is the transition to digital business" (Gartner, 2017). Digitization in business highlights the importance of integrating new technologies into transforming operations and business models through the use of digital technologies and big data platforms (Sorger, 2021). Based on digitization, companies can develop products that apply digital technology, connect with customers through social networking platforms, increase convenience and improve customer experience (Chung et al., 2016).

The transition of traditional banking services to digital banking is not a trivial matter and this transition may encounter external and internal barriers (Osmundsen et al., 2018). Resource-dependence theory (RDT) and resource-based perspective (RBV) can provide a rationale for barriers in digital banking transformation, in which RDT is used to focus on external barriers and RBV focuses on internal barriers

Considering banks' digital transformation as a systematic transformation of all banking operations on a digital basis, RDT represents organizational theory and strategic management to consider the external barriers to the innovation process. The specific RDT study by Pfeffer and Salancik (1978) describes an organization as a system and suggests that external support is necessary for the organization to ensure continual improvement. In addition, empirical studies have demonstrated RBV as a potential theory to identify internal barriers to an organization's innovative activities. Combining RDT and RBV to assess the barriers of bank digitization can explore a bank's innovation ability based on internal resources as well as seeking external support to enhance banks' competitive advantages.

RBV suggests that internal actors include both tangible and intangible resources (Kraaijenbrink et al., 2010). Digital transformation requires expensive and long-term resources, therefore, in the strategy of resource matching for digital transformation, a bank or a banking system can seek outside support to diversify its competitive advantage (Osmundsen et al., 2018). All external links and supports from the community, users, and political authorities are needed. Environmental and institutional factors have proven important for systematic digital transformation, for example, the need for appropriate government support policies to promote successful digital transformation, or the influence of societal influences and culture effect on the development of digital banking in Pakistan and China (Khan, 2022).

2. Research methodology and theoretical research model

This study proposes to evaluate the relative importance of factors affecting the digital transformation process of banks through the TOE model. TOE framework is an organization-level theory developed in the literature by Tornatzky and Fleischer (1990) with three aspects that influence an organization's decision to adopt innovation including organizational context, context technology landscape, and environmental context (Figure 2). In which, the organizational context proposes the factors that belong to the characteristics and operation of the organization such as size, management structure. The technology landscape identifies both internal and external technology platform-related factors related to the organization's operations. Environmental context identifies internal and external environmental factors such as government regulations, competitors. The TOE theoretical framework stands out for its applicability as a comprehensive prism in various research contexts to identify the factors that are important for innovation at the organizational level in the early stages (Nilashi et al., 2016).

Some prior studies have pointed out the barriers in developing digital banking. The growth of information system capabilities (Osmundsen et al., 2018); as well as impediments of traditional habits of middle-aged people - those who are not familiar with digital banking services. Legal barriers contribute to the contextual barrier that refer to the lack of digital transformation guidance in laws and regulations, government support, reliance on information control groups, the relevance of the legal framework to current. Financial barriers are one of organizational factors that refer to investment cost volume because commercial banks must invest huge resources early to put digital banking services into practice. Technological barriers are indicated as lack of unification between business and information systems, the potential of security risks in relation to the loopholes in the framework of information technology development, finance exacerbate technology barriers by preventing the technology acceptance and adoption.

AHP Method

AHP is one of the hierarchical analysis methods used for multi-criteria decision making developed by Saaty (1980). Unpredictable decision-making problems are transformed into a framework system consisting of various stages that take the scale from pairwise comparisons. This is useful in complex judgments involving pairwise contrasts, supporting the qualitative and quantitative properties of each assessment. This method is summarized as follows:

Step 1: State the goal and identify the key factors. After a detailed review of the literature review and assessment

of expert feedback, barriers to digital banking in Vietnam were identified.

Step 2: Set the inverse pairwise comparison matrices. This step compares each identified factor with the rest in terms of their perceived importance based on Saaty's 9-point scale (Satty, 1980). The essential questions of the paired comparison survey are addressed to the experts (see Table 1).

The pairwise comparison matrix A was constructed to calculate the importance of each barrier among the important factors and determined to be:

$$A = [a_{ij}]_{nxn} = \begin{vmatrix} 1 & a_{12} & \dots & a_{1n} \\ 1/a_{12} & 1 & \dots & a_{2n} \\ \dots & \dots & \dots & \dots \\ 1/a_{1n} & 1/a_{2n} & \dots & 1 \end{vmatrix} \quad (1)$$

In which: a_{ij} are the positive elements of the pairwise comparison matrix, i j = 1, 2, ..., n, and n is the number of critical factors. The matrix satisfies the inverse property aij = 1 / aji and the diagonals are equal to 1.

Step 3: Calculate the relative importance of the barriers. After constructing the positive inverse matrix, the eigenvalues (Wi) were calculated using the normalization of the geometric mean of the rows (NGM). NGM is counted as:

$$Wi = \frac{(\prod_{j=1}^{n} aij)^{\frac{1}{n}}}{\sum_{i=1}^{n}\left(\prod_{j=1}^{n} aij\right)^{\frac{1}{n}}} \quad (2)$$

Based on the level of importance of each factor, it is possible to rank the relative importance of all factors.

Step 4: Check the homogeneity ratio (CR). To ensure that the pairwise comparison matrix is consistent, CR is calculated as follows:

$$CR = CI / RI \quad (3)$$

$$CI = (\lambda_{max} - n) / (n - 1) \quad (4)$$

In which: CI represents the consistency index; RI represents the random consistency index (see Satty (1991)) is the index of the pairwise comparison matrix randomly generated by the number of elements and max is the value maximum private. If CR ≤ 0.1, the consistency of the pairwise comparison matrix is acceptable (Saaty, 1991) suggesting that decisions are based on normalized values. Otherwise, the results are inconsistent and the AHP procedure must be repeated until the CR value is satisfied.

Table 1: Key questions of the pairwise comparison survey

Barrier A	EI[a]		VSI		SI		MI		EQI		MI		SI		VSI		EI[b]	Barrier B
	9:1	8:1	7:1	6:1	5:1	4:1	3:1	2:1	1:1	1:2	1:3	1:4	1:5	1:6	1:7	1:8	1:9	
Technology	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Organization
	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Environment
Organization	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Environment

Note: [a]EQI (1: 1) = Equal importance of one barrier over another, MI (3: 1) = Moderate importance of one barrier over another, SI (5: 1) = Essential or strong importance of one barrier over another, VSI (7: 1) = Very strong importance of one barrier over another and EI (9: 1) = Extreme importance of one barrier over another; 8:1, 6:1, 4:1, 2:1 are intermediate values between two adjacent judgement.

[b]MI (1: 3) = Moderate importance of one barrier over another, SI (1: 5) = Essential or strong importance of one barrier over another, VSI (1: 7) = Very strong importance of one barrier over another and EI (1: 9) = Extreme importance of one barrier over another; 1:2, 1:4, 1:6, 1:8 are intermediate values between two adjacent judgement.

3. Empirical study and results

3.1. Data collection

After identifying barriers for digital banking in Vietnam by DELPHI technique, the study continues to interview experts to collect data through the AHP method, expecting that all of them will answer the questions in the table. By email and phone contacts, 30 experts agreed to the questionnaire. These experts are the managers of commercial banks in Vietnam. They are responsible and have the experience and knowledge to assess barriers to the development of digital banking. Detailed profiles of experts are shown in Table 2.

Table 2: Detailed profiles of experts

TT	Basic information	Distribution	Number of experts	Ratio (%)
1	Age	21-30	3	10
		31-40	17	56.67
		41-50	10	33.33
2	Education level	University	12	40
		Graduate	18	60
3	Experience	6-10 years	4	13.33
		11-15 years	9	30
		16-20 years	9	30
		Over 21 years	8	26.67
4	Gender	Female	12	40
		Male	18	60
5	Official title	General manager	7	23.33
		Assistant general manager	8	26.67
		Senior manager	6	20
		Manager	9	30

Source: Author's collection

3.2. Assessing the relative impact of critical barriers: AHP analysis

After several rounds of questionnaire survey, qualified anonymous responses by expert groups were then used in the AHP analysis. After the AHP assessment process mentioned in the research methodology, the rank of critical barriers according to their relative importance is assessed through pairwise comparisons. The Likert 9 scale was used to determine which factor is more critical from an expert's point of view.

After calculating the maximum eigenvalue (λ_{max}) and the consistency index (CI) of each pairwise comparison matrix, the value of the CR consistency ratio for each matrix was evaluated by 30 experts less than 0.1, which indicates that the consistency of each pairwise comparison matrix is acceptable. Table 3 is the opinions of experts that have been compiled in the form of separate weights for each factor.

As shown in Table 3, it can be seen in this result that the technological barriers with a weight of 0.574 is the most important factor in the process of digitizing commercial banks. In the opinion of experts, technological advance is not only a goal but also a process, a plan that any business should invest in. The second most crucial factor for digital

banking in Vietnam is the organizational barriers with a weight of 0.29, followed by the environmental barriers with a weight of 0.136. Through this study, it can be seen that, from the perspective of experts in the banking sector, there are always barriers that are also factors that make up the success of digital transformation to gain competitive advantages.

Table 3: Synthesized decision analysis of critical barriers of digital banking

Critical barriers	Relative importance weights	Ranking order
Technological barrier	0.574	1st
Organizational barrier	0.290	2nd
Environmental barrier	0.136	3rd

Source: AHP Analysis

In addition, to evaluate and rank sub-dimensions, we repeat the steps of AHP for the second level of analysis. The results are shown in Table 4 as follows:

Table 4: Synthesized decision analysis of sub-dimensions

TOE dimension	Sub-dimensions	Local score	Local ranking	Global score	Global ranking
Technological barriers (0.574)	Relative advantage	0.654	1	**0.375**	**1**
	Technological compatibility	0.206	2	**0.118**	**2**
	Technological complexity	0.140	3	0.080	5
Organizational barriers (0.290)	Lack of organizational support and commitment	0.398	1	**0.115**	**3**
	Lack of capital and resources	0.333	2	0.097	4
	Lack of compatible human resource	0.170	3	0.049	7
	Impact of innovation culture	0.100	4	0.029	9
Environmental barriers (0.136)	Customer experiences	0.115	4	0.016	11
	Lack of government supports/ guidance in laws and regulations	0.244	2	0.033	8
	Environmental uncertainty	0.468	1	0.064	6
	Availability of compatible information system	0.173	3	0.024	10

Table 4 shows a summary of final weights and rankings for each sub-dimension in the three criteria of TOE framework, which shows the sequence of critical barriers of digital banking in Vietnam. The results show that the relative advantage of the benefits that banks receive from digital transformation is the most important barrier because of investment cost (0.375). Followed by technology compatibility between innovation and business model and lack of organizational support and commitment with a global weight of 0.118 and 0.115, respectively. Table 4 also shows the impact of financial resources and the difficulties refer to technological complexity and environmental uncertainty.

4. Conclusion

According to the results of AHP analysis, of the three critical barriers, technological barriers have the highest relative impact (0.574), followed by organizational barriers (0.290) and environmental barriers (0.136). In detail, the relative advantage in comparison between benefits and investment cost is the most important factors that affect digital transformation decisions of commercial banks. The difficulty to match innovation and business model, organizational support and commitment also indicate important barriers. Furthermore, it cannot be denied the impact of financial barriers on digitizing process. These results indicate that commercial banks should pay attention to decide innovation strategy regarding bank's commitment and model. Moreover, banks should prepare financial resources for digitizing and seek the effective strategy in order to prevent negative impacts of technological complexity and environmental uncertainty.

In addition, commercial banks in Vietnam face barriers of legal framework, for example, domestic legal regulations are not yet updated to keep up with the current reality that cause obstacles for commercial banks in the process of digitalization at the initial stage of implementing and encouraging banks to integrate sustainable development goals into their purely economic activities. To deal with this problem, related policies and procedures need to be improved as well as more advisory councils to address difficulties in the transition process. In addition, human resources are a crucial part of the digital transformation process's success and avoid adverse effects of technology change.

This study contributes to the existing literature on rating barriers of digital banking. Future studies could extend this research by specifically examining both drivers and barriers to suggest optimal options for digital transformation to further facilitate the process of digitizing commercial banks. Furthermore, future studies could broaden the scope of the study by comparing these barriers with developed countries or conducting research on this issue in the context of other sectors.

References:

Chung, T. S., Wedel, M., & Rust, R. T. (2016). Adaptive personalization using social networks. Journal of the Academy of Marketing Science, 44(1), 66-87.

Gartner. Inc. (2017). Creating Digital Value at Scale. Special report based on the opening keynote of the 2017 Gartner Symposium.

Kaur, S. J., Ali, L., Hassan, M. K., & Al-Emran, M. (2021). Adoption of digital banking channels in an emerging economy: exploring the role of in-branch efforts. Journal of Financial Services Marketing, 26, 107-121.

Khan, I. U. (2022). How does culture influence digital banking? A comparative study based on the unified model. Technology in Society, 68, 101822.

Kraaijenbrink, J., J. C. Spender, and A. J. Groen. (2010), The resourcebased view: A review and assessment of its critiques. Journal of Management, 36(1), 349–372.

Nguyen, T. T., Nguyen, H. T., Mai, H. T., & Tran, T. T. M. (2020). Determinants of digital banking services in Vietnam: Applying utaut2 model. Asian Economic and Financial Review, 10(6), 680-697.

Nilashi, M., H. Ahmadi, A. Ahani, R. Ravangard, and O. Bin Ibrahim. 2016. "Determining the Importance of Hospital Information System Adoption Factors Using Fuzzy Analytic Network Process (ANP)." Technological Forecasting and Social Change, 111, 244–264.

Osmundsen, K., Iden, J., & Bygstad, B. (2018). Digital transformation: Drivers, success factors, and implications.

Pfeffer, J. and G. R. Salancik (1978). The external control of organizations: A resource dependence perspective. New York: Harper & Row.

Saaty, T.L., (1980). The Analytic Hierarchy Process. Mcgraw-Hill International.

Saaty, T.L., (1991). Some mathematical concepts of the analytic hierarchy process. Behaviormetrika, 18(29), 1–9.

Sarel, D., and H. Marmorstein. 2002. Migrating customers to new distribution channels: The role of communication. Journal of Financial Services Marketing, 6(3), 254–266.

Siebel, T. M. (2019). Digital transformation: survive and thrive in an era of mass extinction. RosettaBooks.

Sorger, M., Ralph, B. J., Hartl, K., Woschank, M., & Stockinger, M. (2021). Big data in the metal processing value chain: a systematic digitalization approach under special consideration of standardization and SMEs. Applied Sciences, 11(19), 9021.

Tornatzky, L. and Fleischer, M. (1990) The process of technology innovation, Lexington, MA, Lexington Books.

ENHANCING THE ROLE OF STATE MANAGEMENT IN PHARMACEUTICAL BUSINESS OPERATIONS IN VIETNAM

Tran Ngoc Long*

Abstract: ***The pharmaceutical industry in Vietnam is experiencing robust development; however, there are still various shortcomings in state management concerning pharmaceutical business activities. Enhancing the role of state management in pharmaceutical business operations in Vietnam is a pressing and crucial issue in the context of international economic integration and advancements in science and technology. This article analyzes the current situation and proposes solutions to enhance the role of state management in pharmaceutical business activities in Vietnam under current circumstances.***

• Keywords: *state management, business, pharmaceuticals, Vietnam.*

Date of receipt: 22th December, 2023
Date of receipt revision: 20th February, 2024
Date of delivery revision: 27th January, 2024
Date of approval: 25th March, 2024

1. Introduction

The pharmaceutical industry plays a crucial role in protecting and improving public health in Vietnam. However, in recent times, pharmaceutical business activities in Vietnam have faced several shortcomings, posing potential risks to consumer health. Therefore, enhancing the role of state management in pharmaceutical business operations is of utmost importance.

Firstly, the pharmaceutical market in Vietnam is undergoing complex fluctuations. The increasing demand for medication, coupled with the entry of numerous foreign enterprises, has created a highly competitive market. In this context, state management has been lax and inconsistent, leading to numerous violations in pharmaceutical business activities such as the trading of counterfeit or substandard drugs, drugs of unknown origin, and false advertising, causing confusion among consumers.

Secondly, the misuse of medication has become a pressing issue. Due to insufficient control from the state, many individuals purchase and use medication without proper guidance from a physician, resulting in drug abuse, resistance, and severe health implications.

Thirdly, the current state management of pharmaceutical business activities does not fully meet international requirements. Vietnam has participated in various Free Trade Agreements (FTAs) with commitments to open its service market, including pharmaceutical services. Therefore, enhancing the role of state management in pharmaceutical business activities is necessary to ensure compliance with international regulations, create a fair and healthy business environment, and protect consumer rights. Elevating the role of state management in pharmaceutical business activities is an urgent task that requires coordinated, decisive, and effective implementation to safeguard public health and promote the sustainable development of the pharmaceutical industry.

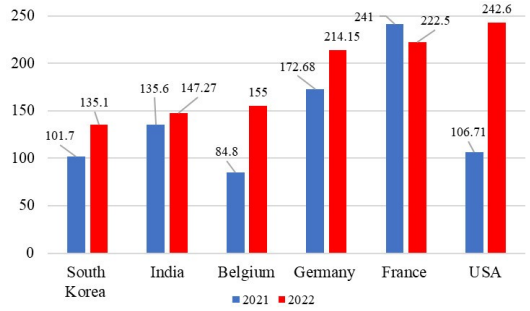
2. Current situation of the pharmaceutical industry in Vietnam

Pharmaceuticals is one of the important economic sectors in Vietnam, as it contributes to ensuring the health of the people and labor force, thereby supporting other industries and sectors in fulfilling their missions effectively. However, the pharmaceutical industry in general, and the operations of pharmaceutical enterprises in particular in Vietnam, still exhibit certain existing issues and limitations, hindering the substantial development of our pharmaceutical sector (Nguyen Manh Ha, 2021). Alongside the recent economic growth, the average per capita income in Vietnam has also increased, and the level of education has risen. Consequently, the willingness to spend on healthcare and medical services has also increased, contributing significantly to the development of the pharmaceutical industry in Vietnam (Thanh Hung, 2023).

The pharmaceutical market in Vietnam is of significant scale, ranking 17th in the Asian region and projected to reach 17 billion USD by 2025. The increasing demand for medication is driven by an aging population, a high prevalence of diseases, and improved healthcare awareness among the population. However, approximately 40% of pharmaceuticals are domestically produced, while the remaining 60% are imported, indicating a considerable dependence on raw materials and finished drugs from abroad.

** Long Pharmacy, 12 Doi Can - Ba Dinh - Hanoi*

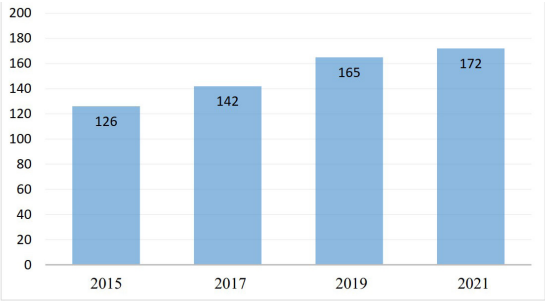
Figure 1: The chart illustrates Vietnam's pharmaceutical import turnover from various countries in the year 2021-2022



Source: General Department of Customs

In terms of production, the pharmaceutical industry in Vietnam has made certain advancements, but challenges persist. While the quality of Vietnamese drugs has improved, issues such as counterfeit and substandard drugs continue to circulate in the market. The adoption of advanced technology in manufacturing is progressing slowly, with many enterprises yet to meet Good Manufacturing Practice (GMP) standards (Nguyen Quang Hung, 2022).

Figure 2: The number of pharmaceutical enterprises in Vietnam with Good Manufacturing Practice (GMP) principles certification during the period 2015-2021



Source: Synthesized from data of the Drug Administration Department, Ministry of Health

Human resources pose a significant challenge for the pharmaceutical industry in Vietnam, particularly in terms of skilled personnel. The workforce's quality needs improvement, especially regarding specialized knowledge and practical skills. The training system must be developed to meet the market's demands.

In terms of policies, the Vietnamese government has issued several policies to develop the pharmaceutical industry; however, there are still some shortcomings that need to be addressed. State management of pharmaceutical business activities needs to be strengthened to ensure drug quality and protect consumer health.

According to a report, the overall situation of pharmaceutical distribution channels in the first ten months of 2023 has shown positive growth, particularly in hospital channels (ETC - prescription drugs). The relaxation and transparency in hospital drug bidding regulations have significantly contributed to the growth in this channel. Notable initiatives include the Law on Examination and Treatment No. 15/2023/QH15, providing autonomy to public hospitals for investment in infrastructure to meet healthcare needs, alleviating congestion issues, and increasing patient visits. As a result, the number of patients seeking medical care in hospitals has increased, boosting the consumption of drugs through the ETC channel. Additionally, the extension of drug registration (Resolution No. 80/2023/QH15) effective from January 2023, Circular No. 06/2023/TTBYT regulating drug bidding at public healthcare facilities, and other government decrees have addressed some immediate challenges for hospitals and pharmaceutical manufacturers. This has led to more dynamic drug bidding activities in the last months of the second quarter, with improved supply levels at hospitals, and an increased import of foreign drugs.

On the other hand, the business situation in the over-the-counter (OTC) sector has shown signs of stagnation, even slight decline, and is currently in a "mixed bag" phase, according to most pharmaceutical experts as shared with Vietnam Report. Firstly, the purchasing power through the OTC channel has been somewhat affected by weakened consumer demand due to reduced consumer incomes. While there was sustained growth in the first quarter, there is a trend of decline from the second quarter, and the second half of the year faces various challenges. Furthermore, after the prolonged pandemic period, taking advantage of the market's confusion during the surge in demand, there has been a surge in purchases and hoarding of health care products, respiratory care products have experienced a sudden increase, and health care products have boomed. However, quality control remains challenging, with counterfeit and substandard products appearing, causing confusion for consumers and negatively affecting the healthy development of the pharmaceutical market.

Looking back at the challenges in recent times, the top 5 major challenges according to pharmaceutical companies' evaluations include: (1) Slow economic growth; (2) Weak consumer demand; (3) Fluctuations in energy prices and input materials; (4) Competition among industry peers; and (5) Increased pressure from exchange rate fluctuations. In 2023, energy price fluctuations, input material price risks, and supply chain risks are no longer the hottest issues compared to the previous year, yielding to the story of slow economic growth. However, it still remains among the top 5 challenges mentioned. In reality, the pharmaceutical market in Vietnam still lacks stability, with production raw materials dependent on 90% imports from foreign countries. This dependence makes the pharmaceutical industry sensitive to external factors such as currency fluctuations, import prices, or shocks to the supply chain. Moreover, most domestic pharmaceutical companies primarily focus on producing generic drugs with low value, low prices, and weak competitiveness,

resulting in a situation where they have to compete both with imported generic drugs and internally within the industry. Therefore, there is an issue of overlapping production, competing for market segments.

On October 9, 2023, Deputy Prime Minister Tran Hong Ha signed Decision No. 1165/QD-TTg approving the National Strategy for the Development of the Pharmaceutical Industry in Vietnam for the period up to 2030 with a vision towards 2045 (the Strategy). According to the strategy, 100% of drugs circulating in the market are to be monitored. The pharmaceutical industry aims to have 30% of generic drugs (excluding locally produced drugs with local bioequivalence for locally produced or imported drugs with registered circulation bioequivalence). All drugs in circulation in the market are to be monitored, and their effectiveness and safety are to be fully managed according to the regulations of the Ministry of Health. Tightly managing the domestic distribution and supply system of pharmaceuticals, the Strategy aims to review and plan the drug supply system to ensure professionalism, modernity, and efficiency. It emphasizes the development of the drug supply system for ethnic minorities, people in mountainous areas, islands, and regions with particularly challenging socio-economic conditions. The strict management of the domestic distribution and supply system aims for modern, professional, and efficient practices. It includes rigorous control over the quality of drugs and comprehensive management of drug production, export, import, storage, circulation, distribution, and usage. The strategy is committed to preventing, combating, and addressing counterfeit and substandard drugs (The Prime Minister, 2023).

3. Solutions to enhance the role of state management in pharmaceutical business activities in Vietnam

The pharmaceutical business is a crucial sector that is closely tied to the health and safety of the population and contributes to the socio-economic development of the country. However, pharmaceutical business activities also pose many risks and challenges, such as the circulation of counterfeit, substandard, and poor-quality products, unhealthy competition, lack of transparency and fairness in market management and operation, and insufficient protection of consumer and business rights.

Given these circumstances, the role of state management in pharmaceutical business activities is necessary and urgent. State management in pharmaceutical business activities includes stages such as planning, establishing policies, and legislation; supervision, inspection, quality control, and safety of pharmaceuticals from production, importation, distribution to use; handling violations; propaganda, education; support, encouragement; international cooperation.

To enhance the role of state management in pharmaceutical business activities in Vietnam, comprehensive and effective solutions are needed, including:

Firstly, *modernizing the pharmaceutical legal system*

Modernizing the pharmaceutical legal system is a multifaceted solution that addresses critical aspects of the industry. This initiative encompasses revising and updating regulations to align with current industry practices, technological advancements, and international standards. By doing so, pharmaceutical companies operate within a framework that prioritizes safety, efficacy, and ethical practices. Moreover, a modern legal system must exhibit adaptability to innovation, allowing for the incorporation of emerging technologies, research methodologies, and innovative pharmaceutical products. This adaptability encourages research and development while ensuring that new advancements comply with safety and ethical standards. Simplifying and streamlining approval processes for pharmaceutical products is another integral facet of this solution. This revision can expedite the introduction of new medicines to the market, benefitting both consumers and pharmaceutical companies. The faster access to potentially life-saving treatments enhances public health outcomes while allowing companies to bring their products to market more efficiently. International collaboration is also crucial, as a modern legal system should facilitate engagement with international regulatory bodies. This collaboration not only aids in benchmarking standards but also fosters the exchange of information and best practices, contributing to global harmonization of pharmaceutical regulations. Additionally, a modern legal system prioritizes consumer protection by ensuring accurate labeling, transparent information dissemination, and effective mechanisms for handling adverse effects. This commitment builds trust between consumers and pharmaceutical companies, fostering a positive and responsible industry reputation.

Intellectual property rights protection is a key component, as robust legal frameworks in this area encourage innovation. Clear regulations on patents and intellectual property rights safeguard the interests of pharmaceutical companies, creating an environment conducive to research and development. Enforcement and monitoring mechanisms are equally vital. A modern legal system implements stringent enforcement measures and regular monitoring to ensure companies adhere to established regulations, promoting accountability and deterring unethical practices. Finally, balancing the need for innovation with ensuring affordable access to essential medicines is a complex challenge. A modern legal system should strive to strike this balance, possibly through incentives for companies that contribute to public health goals or exploring mechanisms for fair pricing. In conclusion, the modernization of the pharmaceutical legal system is an all-encompassing solution that ensures regulatory compliance, fosters innovation, protects consumers, and contributes to global health standards.

Secondly, *capacity building and training*

Strengthening the capabilities of state management agencies is essential. Investing in training programs for regulatory officials ensures they have the knowledge and skills to effectively oversee pharmaceutical activities. This includes staying abreast of the latest advancements in the industry, understanding new technologies, and being well-versed in emerging global trends. A well-equipped regulatory workforce is better positioned to make informed decisions and enforce regulations effectively.

Thirdly, *transparent information exchange*

Promoting transparent communication and information exchange between the government and pharmaceutical businesses is crucial. Establishing platforms for regular dialogue ensures that both parties are well-informed about industry developments, challenges, and regulatory updates. This fosters a collaborative environment, where businesses can contribute insights, and the government can address concerns promptly, creating a more responsive and adaptive regulatory landscape.

Fourthly, *streamlined approval processes*

Simplifying and expediting approval processes for pharmaceutical products can significantly enhance the efficiency of state management. By reducing bureaucratic hurdles, businesses can bring new medicines to market more swiftly, addressing healthcare needs more promptly. Streamlining processes should not compromise safety standards, but rather ensure a balance between speed and thorough evaluation.

Fifthly, *international collaboration and benchmarking*

Actively engaging in international collaboration allows Vietnam to benchmark its pharmaceutical regulatory practices against global standards. Participating in forums, sharing best practices, and aligning with international organizations contribute to the harmonization of regulations. This not only enhances the credibility of the Vietnamese pharmaceutical industry but also facilitates smoother international trade and collaboration.

Sixthly, *technology adoption for monitoring*

Leveraging technological advancements in monitoring and oversight is essential. Implementing robust digital systems for tracking and monitoring pharmaceutical activities provides real-time data to regulatory authorities. This not only improves the accuracy and efficiency of inspections but also enables proactive interventions in case of irregularities or safety concerns.

Seventhly, *public awareness and participation*

Involving the public in the regulatory process is crucial. Increasing awareness among consumers about the importance of regulatory oversight creates a demand for safe and quality pharmaceutical products. Additionally, seeking public input on regulatory decisions ensures a more inclusive and accountable state management approach.

Eighthly, *strategic industry collaboration*

Encouraging collaboration between the government and the pharmaceutical industry fosters a shared responsibility for public health. Joint initiatives, such as public-private partnerships, can address common challenges, drive innovation, and create a more synergized approach towards achieving shared healthcare goals.

In order to implement these solutions, consensus and cooperation among state agencies, businesses, and relevant social organizations are essential. Only in this way can pharmaceutical business activities develop sustainably, contribute positively to protecting the health and safety of the population, and create significant contributions to the socio-economic development of the country.

4. Conclusion

In the context of the rapidly growing pharmaceutical industry, enhancing the role of state management is crucial to ensuring safety, quality, and efficiency in pharmaceutical business activities in Vietnam. State management not only ensures that pharmaceutical products meet safety and quality standards but also plays a crucial role in creating a fair and transparent competitive environment. By strengthening the role of state management, the government can clearly define and enforce relevant legal regulations in the pharmaceutical industry, from research and development to manufacturing and distribution. This helps to tightly control and prevent issues related to food safety and improper use of pharmaceutical products. Furthermore, enhancing management brings benefits in promoting the research and development capabilities of businesses in the industry. State management can create more favorable conditions for businesses to invest in research and development, encouraging innovation and creativity in the production process. In conclusion, enhancing the role of state management in pharmaceutical business activities is not only a concern for businesses but also a societal responsibility. The government needs to define and implement flexible and effective management policies to ensure the sustainable development of the pharmaceutical industry, contributing to improving the quality of life and community health.

References:

Nguyen Manh Ha (2021), Developing the Pharmaceutical Industry in Vietnam: Current Situation and Solutions, Economy & Forecast Review, Issue 35.

Minh Ha (2023), Sustainable Development of the Pharmaceutical Industry in Vietnam, Stepping Towards Modernization, Vietnam Journal of Science and Technology.

Thanh Hung (2023), Tightening Control on the Domestic Distribution System and Drug Supply as part of the Comprehensive Strategy for the Vietnamese Medicinal Materials Industry, Propaganda Journal.

Nguyen Quang Hung (2022), Enhancing the competitiveness of pharmaceutical enterprises in Vietnam in the context of international integration, Doctoral Thesis, Central Institute for Economic Management Research.

Hieu Phuong (2023), The Bright Picture of the Pharmaceutical Industry Businesses in 2023, Economy & Forecast Review.

The Prime Minister (2023), Decision No. 1165/QD-TTg dated October 09, 2023 on approving National Strategy for Vietnam's Pharmaceutical Industry Development by 2020 with a vision towards 2045.

ENVIRONMENTAL, SOCIAL AND GOVERNANCE IMPLEMENTATION IN VIETNAMESE FIRMS

Assoc.Prof.PhD. Bui Quang Hung*

Abstract: ***In the theoretical background, the environmental, social, and governance (ESG) framework provides an aggressive methodology for scrutinizing a firm's influence on the environment, societal dynamics, and internal governance structure. Vietnamese firms recognize the need for ongoing initiatives through rigorous self-assessment processes of ESG implementation. Thus, these firms' key imperatives involve refining ESG and corporate development strategies, enhancing the ESG management framework, and prioritizing critical issues with comprehensive ESG disclosure. This paper aimed to develop a framework for evaluating the level at which ESG is implemented in Vietnamese firms through in-depth interviews with twenty managers. Through qualitative data analysis, the study successfully examined the role of ESG and its implementation level in Vietnamese firms. Along with the theoretical contributions of ESG, the research results provide management implications for Vietnamese firms in terms of promoting the effectiveness of ESG for environmental, social, and governance, thereby enhancing competitive advantage and promoting sustainable developments.***

• Keywords: *ESG, qualitative perspectives, sustainable development.*

Date of receipt: 22th December, 2023
Date of receipt revision: 20th February, 2024
Date of delivery revision: 27th January, 2024
Date of approval: 25th March, 2024

1. An overview of ESG and the appraising the degree of ESG implementation within firms

1.1. An overview of ESG

ESG framework is an evaluative paradigm for gauging a firm's dedication to sustainable and ethical business practices (Dmuchowski et al., 2023). Its prominence has markedly increased in the corporate sphere, driven by investors, consumers, and diverse stakeholders' escalating prioritization of moral, social, and environmental factors. ESG criteria provide a comprehensive methodology for scrutinizing a firm's influence on the environment, societal dynamics, and internal governance structure.

From an environmental standpoint, the ESG framework centers on a firm's impact on the planet, encompassing endeavors to diminish its carbon footprint, manage waste, conserve resources, and embrace ecologically sound practices (Sundberg & Barnekow, 2022). Firms exhibiting robust environmental performance often channel investments into renewable energy, integrate energy-efficient technologies, and comply with rigorous environmental regulations. Addressing environmental concerns contributes to global sustainability and mitigates risks linked to climate change, regulatory compliance, and potential reputational damage. The social dimension of ESG scrutinizes a firm's interactions with its workforce, clientele, local communities, and other stakeholders (Tavanti, 2023). Integral social considerations encompass labor practices, diversity and inclusion initiatives, adherence to human rights, and community engagement. Firms dedicated to social responsibility prioritize equitable labor practices, cultivate inclusive work environments, and engage in philanthropic endeavors. The escalating demand for transparency about a firm's social impact necessitates firms to actively nurture positive relationships with their employees and communities. In governance, the ESG framework evaluates the internal mechanisms guiding a firm's decision-making processes and overall management (Alkaraan et al., 2023). This involves an assessment of corporate governance structures, executive compensation strategies, board diversity, and risk management practices. Firms with robust governance frameworks are more apt to make ethical decisions, augment shareholder value, and adeptly navigate challenges. Effective governance contributes to long-term sustainability by ensuring accountability, transparency, and safeguarding shareholder interests.

The integration and reporting of ESG factors into overall business strategy and decision-making processes indicate the framework's systemic incorporation. Numerous firms now embed ESG considerations

** School of Accounting, University of Economics Ho Chi Minh City; email: bqhung@ueh.edu.vn*

in their annual reports, offering stakeholders a comprehensive overview of their environmental, social, and governance performance (Camilleri, 2015). This transparency fosters trust and credibility with investors, customers, employees, and regulatory bodies. Furthermore, integrating ESG considerations into financial reporting enhances risk management capabilities and facilitates strategic planning. From an investor perspective, the integration of ESG criteria into investment decisions is on the rise. The prevailing belief is that firms demonstrating robust ESG performance are better positioned for sustained success and are less susceptible to financial, regulatory, or reputational risks. The burgeoning demand for sustainable investments has established ESG indices and investment funds, allowing investors to align their portfolios with ethical values. Despite the growing adoption of ESG principles, challenges persist, including the absence of standardized reporting metrics and inconsistent definitions of ESG criteria (Jebe, 2019). The trajectory of ESG may involve heightened standardization, regulatory advancements, and technological innovations aimed at refining data collection and analysis.

In short, ESG has become a foundational framework for appraising a firm's influence on the environment, society, and governance. Firms prioritizing ESG considerations contribute to a more sustainable world and position themselves for enduring success in an ever-evolving business landscape (Sciarelli et al., 2021). As stakeholders persist in emphasizing ethical, social, and environmental responsibilities, ESG is poised to play an increasingly pivotal role in shaping the firm's future.

1.2. The appraising the degree of ESG implementation within firms

The degree to which firms implement ESG practices exhibits considerable variability, influenced by factors such as industry, geographic location, corporate culture, and stakeholder expectations. The evaluation of ESG implementation involves scrutinizing how a firm integrates sustainable and responsible business practices into its operational framework, policies, and decision-making processes. According to prior studies (e.g., Camilleri, 2017; Clément et al., 2023; Parameswar et al., 2023), several critical considerations for appraising the degree of ESG implementation within firms are elucidated below:

ESG reporting and transparency: Firms dedicated to ESG principles frequently disseminate comprehensive reports delineating their performance on environmental, social, and governance metrics. Transparent reporting underscores a commitment to accountability and facilitates stakeholders in assessing the firm's impact.

ESG policies and frameworks: The existence and robustness of formal ESG policies and frameworks within a firm offer insights into the depth of its commitment. Clearly defined strategies addressing environmental impact, social issues, and governance practices signify a proactive approach.

Board and executive oversight: The involvement of the board of directors and executive leadership in ESG matters is pivotal. Entities with specialized committees or board members overseeing ESG initiatives will likely manifest a heightened commitment level.

Integration into business strategy: Firms seamlessly incorporating ESG considerations into their core business strategy are more apt to demonstrate a comprehensive and sustained commitment. ESG should not be perceived as a separate facet but as an integral component of overall business planning.

Stakeholder engagement: Active engagement with stakeholders, including employees, customers, investors, and local communities, indicates a firm's responsiveness to diverse interests. Regular dialogues and collaborations with stakeholders contribute to more effective ESG implementation.

Investment in sustainable practices: Firms investing in sustainable technologies, energy efficiency, and environmentally friendly practices substantiate a tangible commitment to mitigating their environmental impact. This encompasses initiatives such as carbon footprint reduction, water conservation, and waste management.

Employee programs and diversity initiatives: Firms with robust ESG implementation often prioritize employee well-being, diversity, and inclusion. Initiatives such as employee training, health and safety programs, and endeavors to create a diverse and inclusive workplace contribute to a favorable ESG profile.

Supply chain management: Evaluating a firm's efforts to ensure ethical and sustainable practices throughout its supply chain constitutes another facet of ESG implementation. This encompasses responsible sourcing, fair labor practices, and supplier diversity.

Assessing the degree of ESG implementation is dynamic, with industry standards, frameworks, and benchmarks continuously evolving. Investors, rating agencies, and stakeholders increasingly rely on ESG ratings and indices to assess and compare firms based on their sustainability performance. Consistent

demonstration of a high degree of ESG implementation positions firms to enjoy an augmented reputation, improved risk management, and heightened resilience in response to evolving societal expectations and regulatory landscapes.

2. Method

2.1. Research site

Currently, Vietnam is classified as a developing nation experiencing substantial economic growth and an increasing need for natural resources (Tu et al., 2023). Therefore, implementing ESG emerges as a pivotal objective within the sustainable development endeavors of Vietnamese firms. However, a discernible research gap exists in the Vietnamese context, particularly concerning examining cultural values and institutional factors significantly influencing ESG implementation. Thus, a comprehensive understanding of cultural, institutional, and other potential factors in the Vietnamese context is imperative to facilitate effective ESG implementation. Additionally, a focused investigation into ESG practices is essential to aid Vietnamese firms in successfully undertaking environmental preservation and sustainable development initiatives.

2.2. Research design

A qualitative research approach was employed to ascertain the degree of ESG implementation within the corporate milieu of Vietnam. Qualitative data were obtained through in-depth interviews with managers overseeing ESG implementation in their firms. The utilization of in-depth interviews facilitated the exploration of respondents' attitudes, behaviors, and perspectives, allowing participants to articulate and shape their responses (Ghauri et al., 2014). Data collection adhered to a discussion guide developed by Krueger (1998), employing semi-structured questions to delve into participants' viewpoints regarding the extent of ESG implementation within firms. The interviews were conducted face-to-face and accommodated participants' scheduling preferences. Each interview, lasting approximately sixty minutes, was recorded with the explicit consent of the participants. It is pertinent to note that the personal information of interviewees and details of their respective companies were strictly utilized for research purposes and maintained in confidence without disclosure.

2.3. Participants

This investigation engaged middle managers (e.g., department heads and chief accountants) and senior managers (e.g., founders, CEOs, boards of directors, and regional directors) within Vietnamese firms actively implementing ESG. Participants were required to possess at least five years of professional experience and comprehensive insights into the ESG implementation within their respective firms. The success of qualitative research is contingent upon the nuanced perspectives and perceptions of managers regarding the focal issues of this study that surfaced during the interview process. With information saturation as a criterion, a purposive sample of twenty managers was selected. Boddy (2016) and Saunders et al. (2018) elucidated that determining an optimal sample size in qualitative research hinges on the study's purpose, research question, and data density. The selection of twenty managers for this study aligns with established guidelines that render the sample size deemed appropriate.

2.4. Data analysis

In this investigation, leveraging extant scholarly works (e.g., Kirova and Thanh, 2019; Vo et al., 2021), the qualitative data analysis was conducted utilizing QSR-NVivo 14. In alignment with the guidelines elucidated by Creswell (2018), the coding process was systematically executed until the point of data saturation, as advocated by Spiegel et al. (2016). To ensure the dependability and validity of the qualitative findings, the researcher performed independent coding of the dataset, focusing on employing salient interview outcomes as pivotal themes and adhering to the prescribed multiple coding procedure. Iterative data analysis methodologies were systematically employed, encompassing open, axial, and selective coding. After this, the QSR-NVivo 14 software facilitated the comparative analysis of the qualitative data. Any identified incongruities were systematically addressed by utilizing the QSR-NVivo 14 coding comparison query function, by the recommendation posited by Kirova and Thanh (2019), thereby ensuring the methodological robustness and precision of the qualitative analysis.

3. Results

3.1. The degree of ESG implementation in Vietnamese firms

The integration of ESG principles within Vietnamese firms has emerged as an increasingly salient domain, underscoring firms' recognition of the imperatives associated with sustainable and responsible practices. Characterized by its swiftly expanding economy and burgeoning corporate milieu, Vietnam is undergoing a gradual yet discernible assimilation of ESG considerations. From the perspectives of 20 managers, ESG implementation in Vietnamese firms is depicted as follows.

Environmental implementation: Vietnamese firms are commencing to acknowledge the environmental facet of ESG as an integral facet of corporate responsibility. Specifically, numerous firms are adopting measures to curtail their environmental impact, encompassing initiatives geared towards reducing carbon emissions, optimizing energy consumption, and implementing eco-friendly practices within their operational frameworks. Industries such as manufacturing, energy, and agriculture are notably prioritizing sustainable practices to align with global environmental standards and fulfill the expectations of stakeholders mindful of ecological concerns. In this context, the Vietnamese government has been pivotal in advancing environmental sustainability through regulatory interventions. Many environmental regulations have been instituted, mandating firms to adhere to specific environmental benchmarks. This regulatory landscape has induced heightened awareness among firms regarding the imperative of incorporating environmentally responsible practices into their strategic business frameworks.

Social implementation: In social responsibility, Vietnamese firms progressively acknowledge the importance of cultivating positive relationships with their employees, communities, and diverse stakeholders. Practices related to labor, diversity and inclusion initiatives, and community engagement programs are gaining ascendancy. Firms are investing in endeavors that contribute to the well-being of their workforce, promote diversity within organizational structures, and support local communities through philanthropy or community development initiatives. Furthermore, evolving consumer consciousness and preferences are compelling firms to exhibit heightened social responsibility. Consumers are becoming increasingly discerning, revealing a preference for products and services from firms demonstrating a commitment to social causes. This shift in consumer behavior induces Vietnamese firms to accord precedence to social considerations in their operational paradigms to sustain a positive brand image and meet the evolving expectations of their clientele.

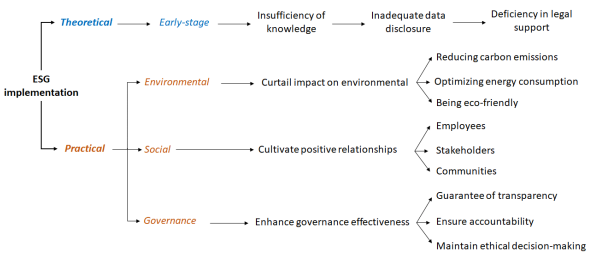
Governance implementation: Governance practices constitute a critical facet of ESG integration within Vietnamese firms. Effective corporate governance serves as a guarantor of transparency, accountability, and ethical decision-making. Vietnamese firms are accentuating the augmentation of their governance structures, encompassing the composition of boards, executive compensation strategies, and risk management practices. The enhancement of governance not only contributes to the long-term sustainability of firms but also augments investor confidence. In reality, the Vietnamese government has implemented regulatory reforms to fortify corporate governance. Besides, the State Securities Commission of Vietnam has instituted guidelines and codes to incentivize listed companies to adopt optimal governance practices. This regulatory impetus and an escalating awareness among firms have engendered an augmented emphasis on governance as an elemental constituent of ESG implementation.

However, ESG implementation in Vietnamese firms has challenges and opportunities. While the degree of ESG implementation is upward within Vietnamese firms, impediments persist. A shortage of awareness and comprehension of ESG concepts, inadequate data disclosure, and the absence of standardized reporting frameworks pose hurdles necessitating redressal. There is a discernible requirement for educational initiatives and capacity-building endeavors to augment ESG awareness among firms, investors, and diverse stakeholders. There are opportunities are rife for Vietnamese firms that proactively espouse ESG principles. Thus, firms can secure a competitive advantage beyond meeting regulatory prerequisites by distinguishing themselves through conscientious business practices. As a result, access to sustainable finance, the allure of socially responsible investors, and the mitigation of risks attendant to environmental and social issues constitute supplementary benefits that accrue from robust ESG implementation.

3.2. The framework of the degree of ESG implementation in Vietnamese firms

Figure 1 presents the framework for determining the degree of ESG implementation in Vietnamese firms. In particular, qualitative findings guided the formulation of this framework derived explicitly from examining how Vietnamese firms have incorporated ESG principles as a strategic measure contributing to enduring sustainability in the super consciousness era.

Figure 1. The framework developed from qualitative analysis



Source: Synthetized by the author

4. Implications

This paper suggests that ESG is becoming an increasingly crucial tool for Vietnam's firms to manage their environmental, social, and governance impact and maintain competitiveness. ESG can compellingly benefit Vietnamese firms, including facilitating these firms in undertaking requisite measures for promoting sustainable development and attaining enduring profitability. The implementation of ESG necessitates an aggressive methodology that encompasses considerations related to environmental impact, social responsibility, and governance practices in a concerted manner. Furthermore, the implementation of ESG within Vietnamese firms can catalyze fostering innovation. This is because of the imperative to frequently adhere to environmental and social standards, which compels these firms to delve into novel technologies, methodologies, and business paradigms. Besides, this innovative trajectory aligns with overarching global sustainability objectives and holds the potential to optimize operational efficiency, curtail costs, and facilitate the exploration of previously untapped revenue streams.

Presently, a mere 35% of publicly listed firms in Vietnam have formalized their commitments to ESG principles, while a noteworthy 58% intend to undertake such obligations within the ensuing 2-4 years. A conspicuous observation is a deficiency in certain Vietnamese firms concerning explicit ESG regulations and a need for leadership to propel ESG commitment. Indeed, ESG considerations transcend mere commitment, actions, and reporting, encompassing future-oriented planning and risk management. Through a meticulous self-assessment process, Vietnamese firms are becoming aware of the imperative for sustained initiatives. Initial efforts entail continually refining the ESG strategy while enhancing the overarching corporate development strategy. Subsequent steps involve fortifying the ESG management framework to delineate precise ESG benchmarks and assess the realization of established objectives. More remarkably, Vietnamese firms are advised to persist in evaluating and prioritizing critical issues and disseminating comprehensive, accurate, and reliable information.

It can be seen that the trajectory of ESG implementation within Vietnamese firms is on an upward trajectory, reflective of a broader global shift towards sustainable and responsible business paradigms. Despite prevailing challenges, the evolving regulatory landscape and changing stakeholder expectations compel Vietnamese firms to integrate ESG considerations into their strategic frameworks systematically. As awareness burgeons and best practices become ingrained, Vietnamese firms stand to position themselves as responsible corporations, thereby contributing to the enduring sustainability of both their firms and the broader economic milieu.

In summation, effectively instituting ESG implementations in Vietnamese firms necessitates leadership commitment, the allocation of adequate resources, and relevant knowledge. Concurrently, transparency and support from the government also prove pivotal. Through such comprehensive measures, ESG can be transformed into an astute and sustainable business strategy within the rapidly evolving landscape of Vietnamese firms.

References:

Alkaraan, F., Elmarzouky, M., Hussainey, K., & Venkatesh, V. G. (2023). Sustainable strategic investment decision-making practices in UK companies: the influence of governance mechanisms on synergy between industry 4.0 and circular economy. Technological Forecasting and Social Change, 187, 122187.

Boddy, C. R. (2016). Sample size for qualitative research. Qualitative Market Research: An International Journal, 19(4), 426-432.

Camilleri, M. A. (2015). Environmental, social and governance disclosures in Europe. Sustainability Accounting, Management and Policy Journal, 6(2), 224-242.

Camilleri, M. A. (2017). The integrated reporting of financial, social and sustainability capitals: a critical review and appraisal. International Journal of Sustainable Society, 9(4), 311-326.

Clément, A., Robinot, É., & Trespeuch, L. (2023). The use of ESG scores in academic literature: A systematic literature review. Journal of Enterprising Communities: People and Places in the Global Economy.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches. In: Sage Publications, USA.

Dmuchowski, P., Dmuchowski, W., Baczewska-Dąbrowska, A. H., & Gworek, B. (2023). Environmental, social, and governance (ESG) model; impacts and sustainable investment-Global trends and Poland's perspective. Journal of Environmental Management, 329, 117023.

Jebe, R. (2019). The convergence of financial and ESG materiality: Taking sustainability mainstream. American Business Law Journal, 56(3), 645-702.

Kirova, V., & Thanh, T. V. (2019). Smartphone use during the leisure theme park visit experience: The role of contextual factors. Information & Management, 56(5), 742-753.

Krueger, R. A. (1998). Analyzing and reporting focus group results (Vol. 6): Sage publications.

Parameswar, N., Hasan, Z., Shri, C., & Saini, N. (2023). Exploring the barriers to ESG adoption using modified TISM approach. Kybernetes.

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., . . . Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. Quality & Quantity, 52(4), 1893-1907.

Sciarelli, M., Cosimato, S., Landi, G., & Iandolo, F. (2021). Socially responsible investment strategies for the transition towards sustainable development: The importance of integrating and communicating ESG. The TQM Journal, 33(7), 39-56.

Spiegel, O., Abbassi, P., Zylka, M. P., Schlagwein, D., Fischbach, K., & Schoder, D. (2016). Business model development, founders' social capital and the success of early stage internet start-ups: a mixed-method study. Information Systems Journal, 26(5), 421-449.

Sundberg, N., & Barnekow, H. (2022). Sustainable IT Playbook for Technology Leaders: Design and implement sustainable IT practices and unlock sustainable business opportunities. Packt Publishing Ltd.

Tavanti, M. (2023). EESG Organizational Sustainability Management. Developing Sustainability in Organizations: A Values-Based Approach, 171-218.

LABOR PRODUCTIVITY OF SMEs IN VIETNAM

Vu Tuan Anh* - Pham Thu Van**

Abstract: ***This study attempts to unveil and prioritize the factors affecting the labor productivity of SMEs in Vietnam. We employ data from the Small and Medium-Sized Manufacturing Enterprises Survey, conducted through research cooperation between Vietnam and Denmark in 2015, to analyze the determinants of labor productivity in SMEs. We find that several firms' and owners' characteristics, including firm age, revenue, total asset, investment, innovation, owner age, gender, member, and education are associated with labor productivity. Policy implications are discussed.***

• Keywords: *labor productivity, determinants, SMEs, Vietnam.*

Date of receipt: 22th December, 2023 *Date of receipt revision: 20th February, 2024*

Date of delivery revision: 27th January, 2024 *Date of approval: 25th March, 2024*

1. Introduction

Labor productivity is the decisive factor in improving the competitiveness of the economy and enterprises. It holds significant importance for promoting long-term economic growth. Increased labor productivity is the primary goal of countries worldwide aiming to escape underdevelopment and become modern industrial nations. For a developing economy, it becomes even more critical when inputs such as capital, land, and natural resources become scarce. Additionally, the labor force is affected by the future trend of population aging.

In the context of Vietnam, during the period 2011-2015, the increase in labor productivity raised GDP from 54.84% to 97.84%. On average, in the same period, the increase in labor productivity contributed to a 4.60% rise in GDP with a contribution rate of 74.53%. In 2020, the increased labor productivity boosted GDP by 4.79%, corresponding to a contribution rate of 167.02%. According to GSO (2023), during the period 2016-2020, increased labor productivity contributed to GDP by 97.00%. The average 10-year contribution of labor productivity to GDP is 85.87%, indicating its great importance and an increasing trend, demonstrating that the economic growth of Vietnam is aligning with the direction of sustainable development.

However, Vietnam's labor productivity remains among the lowest in the Asia-Pacific region. Labor productivity in Vietnam is nearly 15 times lower than that of Singapore, 11 times lower than Japan, and 10 times lower than South Korea. In comparison to neighboring ASEAN countries with similar average income levels, Vietnam's labor productivity is only 1/5 of Malaysia and 2/5 of Thailand. Therefore, improving labor productivity is a crucial task for Vietnamese firms, enabling them to narrow the development gap with other countries in the region and adapt to global trends.

In this paper, we contribute to the existing literature on the determinants of labor productivity by examining the case of Vietnam. Our research question is "What factors affect the labor productivity of SMEs in Vietnam?" Utilizing a sample of 2389 SMEs, we identify two groups of variables - firms' and owners' characteristics - that are relatively associated with labor productivity. Furthermore, we delve into the examination of the individual effects of each factor on SMEs' productivity.

The paper is organized as follows: Section 2 reviews the current literature. Section 3 presents the data and provides the research methods. Section 4 highlights descriptive and empirical results. Section 5 concludes with the findings, implications, and limitations of the research.

2. Literature review

Labor productivity reflects the ability to create wealth, specifically, the efficiency of labor in the production process. It is measured by the number of products or the amount of value created in a unit of time or the amount of time it takes labor to produce one unit of a product. According to the Organization for Economic Cooperation and Development (OECD), labor productivity is calculated by considering the number of final goods and services produced per unit of labor participating in production activities. In particular, the final goods and services created by

** Center for Research and Consultancy in Economics and Business, NEU; email: vutuananh@neu.edu.vn*
*** National Economics University; email: vanpthu@neu.edu.vn*

the economy constitute the Gross Domestic Product (GDP). Labor participating in production activities contributes to the creation of GDP, reflecting the time, effort, and skills of the workforce. This is usually calculated based on the number of workers or working hours.

The topic of labor productivity has been widely discussed in the previous literature. Human capital investment affects labor productivity through output, profitability, and competitiveness (Black & Lynch 1997, Honig 2001, Blundell et al. 1999, Barron et al. 1989, Blackmore and Hoffman 1988). Lynch and Sandra (1996) show that there is a positive relationship between a worker's years of schooling and productivity.

Cin, B.C., Kim, Y.J. & Vonortas, N.S. (2017) also confirm that capital intensity is positively related to labor productivity. Increasing capital intensity will increase the labor productivity of Korean small and medium manufacturing enterprises. According to Nguyen Van Dong (2016), investment capital has a positive impact on the productive capacity of businesses in Vietnam. Nguyen Thanh Hai and Nguyen Thi Le Hoa (2016) point out that businesses that implement R&D projects and have investment capital for R&D activities have higher labor productivity than businesses that do not focus on this investment activity.

Previous studies have shown several factors affecting labor productivity. Employing the firm-level dataset of the Science, Technology, and Innovation Survey of 2011 and 2014 in Ecuador, Quijia-pillage et al. (2021) highlight the significant impacts of internal factors, including education, multiplant status, and investment, as well as external factors such as agglomeration economies and competition on labor productivity by adopting a multiple regression model.

In the case of Korea, Woo, C., et al. (2013) also confirm the effects of green innovation on labor productivity. The rich dataset sourced from the Korea Innovation Survey is used in the analysis. Their findings mean that firms need to engage in green innovation activities to improve their performance. This relationship also changes due to the size of the firm, with larger firms benefiting more from environmental activities than their counterparts. These findings are confirmed by Nicolas B., et al. (2006) in a study of European countries, where the authors analyze the impact of information and communication technology on productivity per employee. The authors find that technological innovation positively affects labor productivity.

In the same vein, Rakhmawati, P., & Karsinah, K. (2021) use both primary and secondary data in the artificial eyelash industry to explore the impact of independent factors such as education, wages, age, and work experience on labor productivity. By applying Multiple Linear Regression analysis, the results show a positive and significant effect of education, wages, age, and work experience simultaneously on labor productivity. However, work experience does not have a significant impact on labor productivity.

In the case of Middle East and North Africa (MENA) countries, Nahla Samargandi (2018) examines several determinants of labor productivity, including compensation, human capital, oil rent, trade, financial development, innovation, and industrialization, using dynamic OLS and fully-modified OLS to analyze the panel dataset. They discover that labor productivity is positively correlated with capital stock and human capital but negatively correlated with employment size. Additionally, labor productivity is significantly boosted by trade openness, oil rent, financial development, and industrial value addition. Ultimately, innovation plays a significant role in raising labor productivity. In the context of Italy, Velucchi, M., & Viviani, A. (2011) employ the original panel data from the Italian National Institute of Statistics at a micro-level (firm level) to provide evidence on the influence of firm characteristics on Italian firms' labor productivity. Results emphasize the roles of innovation and human capital in boosting labor productivity, especially in low-productive firms compared to their counterparts with higher production.

Islam, S., and Syed Shazali, S.T. (2011), investigate the same topic in the manufacturing industry. They find that productivity and skill level have a positive correlation, although not a strong one. According to the study, having a good work environment also shows a positive correlation with productivity. Nonetheless, a strong positive association is discovered between productivity and technology. The study concludes that investing in technology, maintaining a good working environment, and enhancing the level of skills are crucial components of a labor-intensive manufacturing process, which is positively correlated with productivity.

Using the 2018 World Bank enterprise data, a study by Cyprian Amutabi and Anthony Wambugu (2020) provides evidence of the effect of firm size on labor productivity in the context of Kenya's private service sector. The results also show that labor productivity

is favorably and considerably impacted by managers' experience, high school education, capital intensity, and employee wages.

To the best of our knowledge, there are very few studies examining a comprehensive view of the determinants of labor productivity, encompassing both firms' characteristics and owners' characteristics. Therefore, our study aims to investigate the impacts of these two groups of variables on labor productivity, determined as output per labor input. This research makes a significant contribution to bridging the gap in the literature regarding the factors affecting labor productivity, which is the most important factor for enterprise development.

3. Data and methods

3.1. Data

We sourced data from surveys on SMEs in Vietnam conducted by a collaboration of several parties, including the Central Institute for Economic Management, the Institute of Labour Science and Social Affairs, the Development Economics Research Group at the University of Copenhagen (Denmark), and the United Nations University's World Institute of Labor Science and Social Affairs. Data were collected in 2011, 2013, and 2015 from approximately 2,500 manufacturing small and medium enterprises in nine provinces and cities in Vietnam, including Hanoi (including Ha Tay), Hai Phong, Phu Tho, Nghe An, Quang Nam, Lam Dong, Khanh Hoa, Ho Chi Minh City, and Long An.

This survey includes various firm-related issues, such as firm performance, total assets, revenue, access to credit, credit history, innovation, investment, and more. This dataset has been widely used in previous literature (Archer, 2021; Canh et al., 2019; Giang et al., 2019). Following the main idea of the research, we removed any observations with missing values for the variables used. The final sample consists of 6,080 SMEs observations.

3.2. Methods

3.2.1. Variable measurements

As discussed in Nguyen et al. (2016), we choose a set of independent variables, including firms' characteristics and owners' characteristics. Firms' characteristics variables are firm age (L_AGE) which is defined as the logarithm of firm age, revenue (L_REV) which is defined as the logarithm of total revenue, total assets (L_ASSET), investment (INV), innovation (TECH). Owners' characteristics variables are owner's age (L_OAGE) which is defined as the logarithm of age, gender (MALE), party member (MEM), and education (EDU).

A dependent variable is labor productivity (L_LP) which is measured as the logarithm of the ratio of sales to the number of laborers of a firm in 2015.

The list of all variables along with the description and their measurement is in table 1

Table 1. Variables definition

Variable(s)	Definition
Dependent variable	
Labor productivity	The logarithm of the ratio of revenue to total employees of a firm.
Independent variables	
Firms' characteristics	
Firm age	The logarithm of the age of firm
Assets	The logarithm of total assets.
Revenue	The logarithm of total sales.
Investment	Dummy variable, taking 1 if a firm has made any investment since the last survey and 0 otherwise.
Innovation *Owner's characteristics*	Dummy variable, taking 1 if a firm has innovation activity and 0 otherwise.
Party member	Dummy variable, taking 1 if the owner is a member of the Communist Party and 0 otherwise.
Owner's age	The logarithm of age of the owner/manager
Gender	Dummy variable, taking 1 if the owner's gender is male and 0 if female.
Education	Dummy variable, taking 1 if the owner completed an undergraduate or a postgraduate program and 0 otherwise (No professional education, Vocational education, Technical secondary education).

3.2.2. Methods

We use an Ordinary Least Square regression model to examine the factors affecting the labor productivity of SMEs in Vietnam. Our base-line regression model is given as follows:

$$L\_LP_i = \beta_0 + \beta_1 L\_AGE_i + \beta_2 L\_REV_i + \beta_3 L\_ASSET_i + \beta_4 INV_i + \beta_5 TECH_i + \beta_6 L\_OAGE_i + \beta_7 MALE_i + \beta_8 MEM_i + \beta_9 EDU_i + error$$

Where variables are defined as in table 2.

Previous literature (Velucchi, M., & Viviani, A., 2011; Islam, S. and Syed Shazali, S.T., 2011; Woo, C., et al, 2013; Nahla Samargandi, 2018; Quijia-pillage et al, 2021) shows that several firm characteristics such as investment, debt ratio, firm age, firm's total assets are significantly related to labor productivity. Therefore, we expect our coefficients to be significant and positive.

4. Results

4.1. Descriptive statistics

Table 2 shows the descriptive statistics for all the variables used in our paper, including mean, standard

deviation, maximum and minimum values. It indicates that the mean of the logarithm of labor productivity was 11.388, while the average firm size was 13.650. SMEs have an average age of around 16 years, which is not considered young. Regarding innovation activities, approximately 58.2% of total firms were involved in innovation, while approximately 54.3% made investments.

Table 2. Descriptive statistics of variables

Variable	Mean	Std. Dev.	Min.	Max.
Dependent variable				
L_LP				
Independent variables	11.388	1.332	-0.059	18.135
Firm characteristics				
L_AGE	2.804	0.469	1.609	4.190
L_ASSET	13.650	1.824	4.595	19.567
L_REV				
INV	0.582	0.493	0.000	1.000
TECH	0.543	0.498	0.000	1.000
Owner characteristics				
L_OAGE	0.684	0.809	0.000	2.000
MALE	0.669	0.471	0.000	1.000
MEM	0.095	0.293	0.000	1.000
EDU	0.250	0.433	0.000	1.000
Number of observations	6,080			

Table 2 further indicates that male executives owned 66.9% of firms. Approximately 0.95 percent of them were members of the Communist Party. Twenty-five percent of the owners completed their undergraduate degree or above.

4.2. Empirical results

Correlation matrix

Table 3: Correlation matrix

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1.L_LP	1.000									
2. L_AGE	0.354*	1.000								
3. L_REV	-0.101*	0.017	1.000							
4. L_ASSET	0.128*	0.152*	-0.071*	1.000						
5. INV	0.086*	-0.026	-0.047	0.491*	1.000					
6. TECH	0.035	0.002	0.034	0.078*	0.069*	1.000				
7. L OAGE	0.160*	0.157*	-0.052*	0.065*	0.072*	-0.031	1.000			
8. MALE	-0.166*	-0.289*	0.120*	-0.080*	0.007	0.069*	-0.077*	1.000		
9. MEM	-0.053*	0.067*	0.012	0.048	0.005	0.013	-0.040	0.005*	1.000	
10. EDU	-0.210*	-0.151*	0.065*	-0.124*	-0.126*	-0.041	-0.097*	0.179	0.145*	1.000

*Note: * p < 0.05*

The variable correlation matrix is shown in Table 3. The results demonstrate that, at a 5% significance level, several variables are significantly correlated with labor productivity (L_LP), including firm age (F_AGE), total revenue (L_REV), total asset (L_ASSET), investment (INV), technology (TECH), owner's age (O_AGE), male (MALE), member (MEM) and educational level (EDU). Each pair of variables' correlation value is less than 0.8, indicating that there is no multicollinearity in this mode. There is no correlation between independent variables: technology (TECH) with labor productivity.

Regression results

Table 4: OLS regression results

Variables	Coefficient	S.E.	t-stats
L_AGE	-0.005***	(0.002)	-2.630
L_REV	0.015**	(0.010)	1.420
L_ASSET	-0.021***	(0.015)	1.340
INV	0.073**	(0.042)	1.760
TECH	0.057*	(0.038)	1.480
O_AGE	-0.004**	(0.002)	-2.270
MALE	0.051*	(0.042)	1.230
MEM	0.147*	(0.087)	-1.690
EDU	0.101**	(0.119)	-0.850
Obs.	6,080		
F(31, 6071)	13.15***		
Adj. R-squared	0.201		

*Notes: * p<0.1; ** p<0.05; *** p<0.01. Standard errors are in parentheses.*

Table 4 denotes the results of OLS regression to scrutinize the relationship between independent variables and labor productivity. The results show as follows: Our results demonstrate a negative coefficient of firm's age (*coef.= -0.005)* with the level of significance at 1%, implying that firms having a long-term history tend to be less productive. This is also highlighted in a study by Rand (2007) who find older firms have lower access to credit than younger firms, which leads to decrease firm performance.

In regard to revenues, we find a positive relationship between revenue and labor productivity at the significant level of 5% (*coef.=0.015).* Holding other things unchanged, firms having better revenue are likely to have a higher level of labor productivity than their counterparts by 1.5%. Our finding is in line with results in previous studies highlighting that firms with greater sales tend to present the highest propensity of productivity.

As seen, the coefficient of assets is negative (*coef.=-0.021*) and significant at 1% level, suggesting that larger firms tend to perform better in productivity than smaller ones by 2.1%, holding other factors fixed. Our finding is consistent by a study by Rand (2007) who found a positive relationship between firm's size and firm performance. As well, results show a positive and significant coefficient of investment (*coef=0.073, sig.=5%*) suggesting that firms performing investment activities are more likely to have higher labor productivity than those without investment by 7.3%. This finding is similar to the finding by Velucchi, M., & Viviani, A. (2011) and Islam, S. and Syed Shazali, S.T. (2011) in regard to a positive and significant

association between investment and productivity, confirming the importance of investment in firm performance.

Likewise, we find significantly positive relationship between technology and productivity (*coef.=0.057*) at the significance level of 10%, which is emphasized in the literature. Our findings suggest that those applying innovation activities in operation tend to be more productive than their peers by 5.7%, holding other factors fixed.

Regarding to owner characteristics, results show that the coefficient of owner age is negative (*coef.=-0.004*) and significance at 5% level, which implies that firms having younger leaders are more likely to have better productivity by 0.04% than their counterparts when keeping other factors unchanged. This finding is in line with literature who find that labor productivity is strongly positively influenced by owner age.

Adversely, male-owned firms tend to be more innovative than female-owned firms by 5.1%, shown through the positive and significant coefficient (*coef.= 0.051, sig.=10%*). Our findings that labor productivity is positively affected by owner's gender are consistent with the literature (Fairlie and Robb, 2009) who find that male owners often have more work experience and are willing to take risks to invest in venture alternatives to make better revenue.

The coefficient MEM is significant and positive (*coef.=0.147, sig,=10%*), showing that businesses having owners as members of the Communist Party are less productive than those without by 14.7%. This is probably because owners could take advantage of their networking to help businesses improve their labor productivity.

The educational level of the owner is found to have a positive relationship with labor productivity. Accordingly, firms whose owner finished their undergraduate or above perform a better level of labor productivity by 10.1% than those had no professional education, or graduated from a college or high school. This finding is consistent with Akoten et al., (2006) and Tran and Santarelli., (2013) who state that owner's qualifications and degrees might help firms improve their business strategies and management.

5. Conclusions

This study brings forth several key empirical findings and contributions to the existing literature on factors affecting labor productivity. First, labor productivity is influenced by a set of firm characteristics such as age, revenue, assets, investment, and technology.

Second, we find that owner characteristics, including membership, education, and gender, have a positive effect on labor productivity. Firms with a male owner, an owner who is a member of the Communist Party, or an owner with a higher educational level perform better in productivity than their counterparts in the case of SMEs in Vietnam. Conversely, owner age has a negative impact on productivity.

Our findings shed light on investigating determinants of labor productivity in SMEs, suggesting policy implications to enhance the labor productivity of SMEs. Local governments may support firms in doing business through an investment channel as a foundation for firms to improve their innovative level. They could also encourage enterprises to undertake innovative activities by improving existing products or introducing new technology or new products. These policies can be helpful in enhancing a firm's labor productivity.

The major limitation of the study is the lack of data. We only employ data on SMEs in Vietnam in 2015. The database covers about 2,500 firms in only nine provinces/ cities in Vietnam. Thus, future studies can expand the scope by using panel data from the SME Survey.

References:

Akoten, J. E., Sawada, Y., & Otsuka, K. (2006). The determinants of credit access and its impacts on micro and small enterprises: The case of garment producers in Kenya. Economic Development and Cultural Change, 54(4), 927-944.

Archer, L. T. (2021). Formality and financing patterns of small and medium-sized enterprises in Vietnam. Emerging Markets Finance and Trade, 57(10), 2852-2869.

Barron, John M.; Black, Dan A.; Loewenstein, Mark A. (1989). Job Matching and On-the-Job Training. Journal of Labor Economics, 7(1), 1–19.

Sandra E. Black and Lisa M. Lynch (1996). Papers and Proceedings of the Hundredth and Eighth Annual Meeting of the American Economic Association San Francisco, CA, January 5-7, 1996. Human-Capital Investments and Productivity. The American Economic Review, 86(2), 263–267.

Blakemore, A., & Hoffman, D. (1988). Seniority rules and productivity. Unpublished, Arizona State University, Tempe.

Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human capital investment: the returns from education and training to the individual, the firm and the economy. Fiscal studies, 20(1), 1-23.

Canh, N. T., Liem, N. T., Thu, P. A., & Khuong, N. V. (2019). The impact of innovation on the firm performance and corporate social responsibility of Vietnamese manufacturing firms. Sustainability, 11(13), 3666.

Cin, B. C., Kim, Y. J., & Vonortas, N. S. (2017). The impact of public R&D subsidy on small firm productivity: evidence from Korean SMEs. Small Business Economics, 48, 345-360.

Cyprian Amutabi;Anthony Wambugu; (2020). Determinants of labor productivity among SMEs and large-sized private service firms in Kenya . African Development Review,

Fairlie, R. W., & Robb, A. M. (2009). Gender differences in business performance: Evidence from the Characteristics of Business Owners survey. Small Business Economics, 33(4), 375-395.

Giang, M. H., Trung, B. H., Yoshida, Y., Xuan, T. D., & Que, M. T. (2019). The causal effect of access to finance on productivity of small and medium enterprises in Vietnam. Sustainability, 11(19), 5451.

Honig, B. (2001). Learning strategies and resources for entrepreneurs and intrapreneurs. Entrepreneurship Theory and Practice, 26(1), 21-34.

Islam, S. and Syed Shazali, S.T. (2011), Determinants of manufacturing productivity: pilot study on labor-intensive industries. International Journal of Productivity and Performance Management, Vol. 60 No. 6, pp. 567-582.

Nahla Samargandi (2018) Determinants of Labor Productivity in MENA Countries, Emerging Markets Finance and Trade, 54:5, 1063-1081

Nguyen TL, Phan HM, and Bui BK (2016). Liabilities and the impacts on financial performance of the Vietnamese listed small and medium-sized enterprises. Journal of Economics and Development, 18(3): 41-63.

Nicolas Belorgey; Rémy Lecat; Tristan-Pierre Maury (2006). Determinants of productivity per employee: An empirical estimation using panel data. , 91(2), 0–157.

Quijia-Pillajo, Jonathan; Guevara-Rosero, Carolina; Ramirez-Alvarez, José. Determinants of Labor Productivity for Ecuadorian Companies in the Period 2009-2014. Rev Politéc. (Quito) [online]. 2021, vol.47, n.1, pp.17-26.

Rakhmawati, P., & Karsinah, K. (2021). Determinants of Labor Productivity in the Artificial Eyelashes Industry. Economics Development Analysis Journal, 10(2), 221-232.

Rand, J. (2007). Credit Constraints and Determinants of the Cost of Capital in Vietnamese Manufacturing. Small Business Economics, 29(1/2), 1–13.

Tran, H. T., & Santarelli, E. (2013). Capital constraints and the performance of entrepreneurial firms in Vietnam. Industrial and Corporate Change, 23(3), 827-864.

Velucchi, M., & Viviani, A. (2011). Determinants of the Italian labor productivity: a quantile regression approach. Statistica, 71(2), 213–238.

Woo, C., Chung, Y., Chun, D., Han, S., & Lee, D. (2013). Impact of Green Innovation on Labor Productivity and its Determinants: an Analysis of the Korean Manufacturing Industry. Business Strategy and the Environment, 23(8), 567–576

FACTORS INFLUENCING NON-PERFORMING LOANS IN VIETNAMESE COMMERCIAL BANKS

MA. Nguyen Ngoc An*

Abstract: ***This study examines the influence of economic growth on Non-Performing Loans (NPLs) in Vietnamese commercial banks. Findings suggest that economic growth lacks statistical significance in affecting NPLs, indicating that customer repayment behavior and internal factors within enterprises play more significant roles. To address NPLs and mitigate credit risk, Vietnamese commercial banks, the State Bank, and the Government should focus on accurate NPL identification, proactive NPL management strategies, and the establishment of a legal framework for NPL securitization. Additionally, tax exemptions on debt trading activities could stimulate the debt trading market, offering potential solutions to reduce NPL-related losses and encourage private investor participation.***

• Keywords: *NPL, credit risk, commercial banks.*

Date of receipt: 22th December, 2023 *Date of receipt revision: 20th February, 2024*

Date of delivery revision: 27th January, 2024 *Date of approval: 25th March, 2024*

1. Introduction

Associated with lending is the risk that no bank or economy can avoid, which is NPL. Since 2008, the year marking the beginning of the global financial crisis, the NPL ratio has significantly increased. Consequently, the issue of NPL has consistently garnered attention, not only within the banking industry but also among countries worldwide. Inefficient lending within the banking system gives rise to credit risk, considered the most severe risk, as high levels of NPLs can lead to declining profits and reduced long-term efficiency of a bank. A high NPL ratio affects resources, leading to inefficient capital utilization by banks and challenges regarding their payment capabilities. Furthermore, NPLs have a substantial impact on banks' functions, causing the weakening of bank assets and a decline in income as non-recoverable debts accumulate. Ahmed et al. (2006) argue that elevated levels of non-performing loans in the banking system indicate the presence of systemic risks, which can influence deposit amounts and restrict the activities of financial intermediaries, ultimately negatively affecting investment and economic growth. Notably, if the NPL situation fails to improve, it will erode the creditworthiness of commercial banks in their lending operations or, in the worst-case scenario, lead to bankruptcy.

But, it is also the most complex and potentially risky activity. Risks in credit activities can have a great impact on other business activities and can damage the reputation and position of the bank. In fact, over the past years, Vietnam's commercial banking system has implemented many synchronous measures throughout the system to strengthen the restriction and prevention of credit risks, strictly control the quality of loans, constantly improve internal regulations, enhance the quality of human resources, and provide professional ethics education for all employees.

However, due to a variety of reasons, of which the subjective cause is mainly the NPL ratio tending to increase in the years 2012-2015, many debts are likely to lose capital and continue to appear in 2018 despite the decrease in the NPL ratio. Especially the weaknesses in preventing and limiting credit risks have caused the "loss" of officials, resulting in a reduction in the income of banks during the years 2012-2015. Based on the aforementioned practices, this study analyzes "the influence of factors leading to NPL affecting credit risk at Vietnam Commercial Bank" with the expectation that the results of the study will propose ideas to improve the NPL ratio of commercial banks in the period 2012-2021 in the future.

2. Literature review

The concept of Non-Performing Loans (NPL) varies in definition and perspective, often interchangeably referred to as 'doubtful debt' or simply 'NPL'. NPLs signify loans overdue for more than 90 days without repayment of principal and interest. Definitions differ across countries. AEG categorizes NPLs based on

** Military Commercial Joint Stock Bank*

overdue payments, refinancing, or doubts about full payment. The IMF defines NPLs regarding overdue payments or concerns about full repayment. The BCBS emphasizes borrower capability and overdue payments. NPLs are characterized by overdue loans and doubts about full repayment. The article utilizes the NPL-to-total-outstanding-loans ratio for quantitative research in official reports, following Vietnamese accounting standards.

2.1. The concept of NPL

The concept of Non-Performing Loans (NPL) is subject to various perspectives and interpretations, depending on the researchers' approaches and viewpoints. The term 'nonperforming loan' can be interchangeably referred to as 'NPL' or 'doubtful debt' (Fofack, 2005). NPL refers to loans that have remained overdue for more than 90 days without any repayment of principal and interest (Rose, 2009; Miskin, 2010). However, it is essential to note that the concept of NPL is not universally consistent across different countries. Several commonly cited concepts of NPL are as follows:

According to AEG (2014), a debt is considered NPL if it satisfies any of the following conditions: (i) interest and/or principal payments have been overdue for more than 90 days; or (ii) unpaid interest has been refinanced or principal has been extended for 90 days or more, or (iii) payable amounts have been outstanding for less than 90 days, but there are reasons to doubt full payments will be made.

The International Monetary Fund (IMF) defines a loan as nonperforming when interest payments and/or principal have been overdue for 90 days or more, or when interest payments have been restructured or extended for 90 days or more, or when payments are less than 90 days overdue, but there are reasons to suspect full repayment will not be made (IMF's Compilation Guide on Financial Soundness Indicators, 2004). In essence, NPLs are associated with two factors: (i) overdue for more than 90 days, and (ii) doubts about the borrower's ability to fully repay the debt.

Meanwhile, the Basel Committee on Banking Supervision (BCBS) has not provided a specific definition for NPL. The BCBS determines that a debt is considered nonperforming when either of the following two conditions is met: (i) the bank finds that the borrower is incapable of repaying the debt in full, and no action has been taken to recover the debt, such as handling the collateral; or (ii) the borrower has overdue payments for more than 90 days. The BCBS particularly emphasizes the concept of 'expected loss' when evaluating a loan.

In summary, based on the aforementioned concepts, NPL is determined by two main factors: (i) a debt that remains overdue for both principal and interest payments for 90 days or more, and (ii) doubts regarding the borrower's ability to fully repay the debt. The article also utilizes the ratio of NPL to total outstanding loans in official reports, according to Vietnamese accounting standards of commercial banks, for conducting quantitative research.

2.2. Classification of NPLs

The State Bank of Vietnam classifies credit institution debts into five groups according to their quality:

- Group 1: Qualified debt. This category includes all credits accepted by banks. These debts have principal and interest payments within the term, with no difficulties in debt repayment, and are forecasted to be fully repaid according to the commitment.

- Group 2: Debts that need attention. These debts are in a situation where there may be a risk of not being paid in full. The signs of potential payment issues are detected during loan monitoring. Although the situation is not severe, when a debt moves from group 1 to group 2, it indicates a worsening situation, and the bank needs to pay attention and take timely measures.

- Group 3: Subprime debt. This category includes debts with the potential for partial loss of principal and interest. It consists of debts with principal and/or interest overdue for more than 90 days or collateral that has reduced in value, resulting in loss if timely measures are not taken.

- Group 4: Doubtful debt. This category refers to high-loss liabilities defined as irrecoverable principal and/or interest that has been past due for more than 180 days.

- Group 5: Irrecoverable debt. Debts in this group are considered to have lost capital when the principal and/or interest have been overdue for more than 1 year.

It is important to note that NPLs include debts from group 3 and below..

2.3. Research on the factors affecting NPL

Several studies have suggested that the credit risk of commercial banks can be gauged by examining

the Non-Performing Loan (NPL) ratio, which is calculated as the total NPLs divided by the total outstanding loans. Notable examples of such studies include the works of Jin-Li Hu, Yang Li, Yung-Ho Chiu (2004), Fadzlan Sufian & Royfaizal R. Chong (2008), Nguyen Thi Thai Hung (2012), Rasidah M. Said and Mohd H. Tumin (2011), and Tobias Olweny & Themba M. Shipho (2011).

For instance, Abhiman Das and Saibal Ghosh (2007), in their examination of state-owned commercial banks in India from 1994 to 2005, identified factors influencing credit risk, including micro and macro factors such as GDP growth, bank size, actual credit growth, and operating costs. They employed the GMM (Generalized Method of Moments) method developed by Lars Peter Hansen (1982) to analyze the lag of micro-variables, ensuring robust and effective estimates. Yurdakul Funda (2014) focused on macroeconomic factors, such as inflation rate, interest rate, ISE-100 index, exchange rate, GDP growth rate, money supply M2, and unemployment rate.

Tran Chi Chinh (2012) analyzed the NPL situation in select commercial banks in Vietnam from 2007 to 2011, which included banks such as the Joint Stock Commercial Bank for Foreign Trade of Vietnam, Joint Stock Commercial Bank for Industry and Trade of Vietnam, Joint Stock Commercial Bank for Asia, Joint Stock Commercial Bank for Saigon Thuong Tin, Joint Stock Commercial Bank for Import and Export of Vietnam, and Military Joint Stock Commercial Bank. Chinh identified two main groups of factors affecting credit risk and causing NPLs: factors originating from the bank itself (credit policy, credit staff, and customer information sources) and factors related to customers (improper loan usage, unwillingness to repay debts, weak qualifications and management capacity leading to ineffective loan utilization, and poor financial situations).

Ravi Prakash Poudel & Sharma Poudel (2013), in their work on "Macroeconomic factors affecting credit risk at the Nepal Industrial Bank," studied 31 commercial banks in Nepal from 2001 to 2011. Their regression results indicated that four factors influenced the credit risk of these banks: gross domestic product (GDP), inflation rate, monetary supply, and interest rate market, as well as exchange rate fluctuations.

Furthermore, Ahlem & Fathi (2013) investigated the factors influencing credit risk through the NPL ratio in 85 commercial banks across three countries (Italy, Greece, and Spain) during the period 2004-2008, a time marked by financial problems after the subprime lending crisis in 2008. The authors employed the GMM dynamic panel data method combined with pooled OLS regression. Their research findings demonstrated an inverse correlation between GDP growth rate and Return on Assets (ROA) with the NPL ratio, while the unemployment rate and nominal interest rate were positively correlated with the NPL ratio.

Marijana Curak, Sandra Pepur, and Klime Poposki (2013) examined the factors influencing the NPL ratio in the Southeast European banking system. Their study encompassed 69 banks in 10 countries between 2003 and 2010, revealing that low economic growth, high inflation, and high nominal interest rates increased non-performing loans. Additionally, they found a negative relationship between bank size and the NPL ratio, indicating that larger banks were better equipped to address the problem of asymmetric information.

3. Methodology

After reviewing previous studies on issues related to NPL and relevant theoretical frameworks, the author has identified the following factors that affect NPL. These factors will be included in the author's proposed research model. Among these models, the author has chosen the model developed by Amit (2015) due to its similarity to Vietnam's economic conditions, which makes it suitable for adaptation and study in Vietnam. However, in Vietnam, inflation has a significant impact on the economy. Fluctuations in material prices affect production costs, which in turn affect the loan amounts of enterprises and overall consumption in the economy. The author has found that the study conducted by Nir (2013) incorporated inflation variables into Amit's (2015) research. However, Nir's study primarily focused on macro factors rather than internal factors of banks and their impact on NPL in commercial banks. Therefore, the author has decided to bridge this gap by developing a research model that covers both macro and internal factors for this particular topic.

In which: i and t = [1, 2, ..., N], In the context of this study, the variables are denoted as follows: i represents the bank number (27 banks), and t represents the study year (9 years). The intercept coefficient is denoted as p0, and Si,t represents the error term.

The dependent variable in the analysis is the non-performing loan ratio (NPLi,t), which is defined as

the ratio of non-performing loans of bank i in year t to its total loan portfolio.The independent variables include:

+ Bank size (SIZEi,t): This variable reflects the size of bank i in year t.

+ Return on equity (ROEi,t): This variable measures the return on equity of bank i in year t.

+ Credit growth rate (GOWi,t): This variable represents the growth rate of credit for bank i in year t.

+ Credit risk provision ratio (LLRi,t): This variable indicates the credit risk provision ratio of bank i in year t.

+ GDP growth rate (GDPi,t): This variable captures the economic growth rate in year t.

+ Inflation rate (INFi,t): This variable represents the inflation rate in year t.

The study aims to examine how these independent variables influence the non-performing loan ratio of Vietnamese commercial banks over the 9-year period and across the 27 banks included in the analysis. The regression analysis will use the pooled regression model (Pooled OLS), fixed effects model (FEM), and random effects model (REM) with the method of feasible generalized least squares (FGLS) to estimate the relationships between the dependent and independent variables and identify significant factors affecting NPL and credit risk in the banking sector.

Table 1: Describe the variables in the model

Factors	Targets	Unit	MEASURING	Signed hope
Micro factors	bank size	SIZEi;t	Log(Total assets,t)	(+)
	Net return on equity ratio	ROEi;t	Profit after tax	(-)
	Ratio of risk provision.	LLRi,t	Provision for credit risk andtotal credit balance	(+)
	Credit growth rate	GROWi,t	Debit balance - Debit balance t-1 / Debit balance $_{t-1}$	(+)
Macro factors	Growth rate of gross domestic product	GDPt	GDp t - GDp t-1 / GDp t-1	(-)
	Inflation rate	INFt	CPi t - CPi t-1 / CPi t-1	(+)

Source: Author group

3.1. Data for research

The macro data set utilized in this investigation comprises the Gross Domestic Product (GDP) growth rate and the annual inflation rate, covering the time span from 2011 to 2021. These macroeconomic indicators were sourced from reputable institutions, namely the World Bank (WB) and the General Statistics Office (GSO). The data is presented as percentages, allowing for a comprehensive analysis of the economic performance and price trends over the specified period.

On the other hand, the micro data set employed in this research stems from a different source, primarily relying on secondary data extracted from the consolidated financial statements and audited annual reports of 27 Vietnamese commercial banks. The data spans from 2011 to 2021, encompassing valuable insights into the financial health, operational efficiency, and overall performance of these banks.

By combining both the macro and micro data sets, this study aims to provide a holistic perspective on the economic dynamics and banking sector performance in Vietnam during the specified time frame. The integration of macroeconomic indicators and individual bank data enables a comprehensive analysis of the interplay between national economic trends and the financial condition of commercial banks, offering valuable implications for policymakers, investors, and other stakeholders in the Vietnamese economy.

3.2. Model estimation method

To achieve the aforementioned research objectives, the article employs a combination of qualitative and quantitative methods.

For the qualitative method, the author employs techniques such as description, listing, and synthesis of previous empirical studies. The author also summarizes theories and previous research papers related to the topic, focusing on identifying the theoretical basis and factors influencing NPLs in commercial banks. Comparative analysis and synthesis methods are utilized to discuss the research findings and provide recommendations.

Regarding the quantitative method, the author employs the least squares regression method to estimate the research model. Three types of models specifically designed for panel data analysis are utilized: In this study, we employ the pooled regression model (Pooled OLS), the fixed effect model (FEM), and the random effect model (REM) as econometric techniques to analyze the data. Additionally, the general feasible least squares method (FGLS) is used to address issues such as heteroscedasticity and autocorrelation.

4. Research results

4.1. Summary of the study sample's descriptive statistics

Table 2. The presentation of descriptive statistics for the sample under study

Variable name	Mean	Standard deviation	Minimum	Maximum value
NPL	(.0471)	0.0422	0	0.1673
SIZE	8.5622	0.6233	7.2355	9.3568
R OE	1361	0.0789	0	0.3111
L LR	0.0168	[0088]	0	0.0267
G ROW	0.0866	0.0411	0.0355	0.3679
GDP	0.0498	[0144]	0.0280	0.0579
INF	0.0311	0.0194	0.0071	0.0620

Source: Extract from Stata software

Table 3. Correlation of variables in the model

	SIZE	ROE	LLR	GROW	GDP	INF
SIZE	1, 0000					
ROE	0.6245	1, 0000				
LLR	0.4889	0.5344	1,0000			
GROW	0.0246	: 1965	0.3378	1.0000		
GDP	1678	-0.0345	-0.0688	-0.0378	1.0000	
INF	0.6118	0.5678	0.5467	1399	-0.2577	1.0000

Source: Extract from Stata software

According to Table 4, the correlation matrix is used to assess the influence and degree of impact of independent variables in pairs. It allows us to identify which pairs of independent variables are correlated, meaning they have an effect on each other. In the correlation coefficient model, the values range from low to high, with the highest coefficient being 0.6245. According to the comparison standard established by Farrar and Glauber (1967), a threshold of 0.8 is considered for serious multicollinearity. Since the observed values are below this threshold, there is no significant multicollinearity phenomenon.

Table 4. Pooled OLS model estimation results, fixed impact (FEM) and REM random impact

FACTORS AFFECTING	Pooled OLS Model	The FEM Model	REM model
SIZE	[0098]	(.0133)	0,0464
ROE	0.0246	0.0589	0, 063
LLR	1.5422	1.4999	1,4636
GROW	0.4567	0.4454	0.4355
GDP	0.0251	01239	0.0169
INF	0.4451	0.2733	0.4234
Constant	1112	-0.1478	1142
R-Squared	0.7567	7816	0.7567
R-Squared	0.7567	0.6998	0.7255
F(6,258)	88.26	99.22	471.68

Source: Run results from Stata software

The regression results of the three models, the relevance of the three models is higher than 70%, the correlation mark of independent variables to NPLs of all three models is the same, which proves the relevance of the research data. On the other hand, in the results of the three models, the GDP variable is not statistically significant or has no impact on NPL. Therefore, it is necessary to conduct the final conformity test to get the official research results.

Comparison of the goodness of fit between the fixed effects model (FEM) and the random effects model (REM)

To determine the appropriate model for further analysis, whether it is a fixed effects model (FEM) or a random effects model (REM), the author employed the Hausman test a statistical test commonly used in econometrics. The test hypotheses are as follows:

Hypothesis H0: There is no correlation between the independent variables and the residuals, indicating a suitable REM model. Alternative Hypothesis H1: There is correlation between the independent variables and the residuals, indicating a suitable FEM model.

Based on the results of the Hausman test, with a p-value of 0.000, which is less than the significance level of 0.05, the author accepts the hypothesis H1 and rejects the hypothesis H0. This suggests that the fixed effects model (FEM) is the more appropriate model for the research.

Among the three models tested the pooled OLS model, the FEM model, and the REM model the FEM model exhibits the highest stability. Thus, the results of the Hausman test support the selection of the FEM model as the most suitable model for analyzing the subsequent findings of the study.

Testing of defect phenomena and defect remediation for the FEM stationary impact model

Table 5. Results of defect testing of the FEM fixed impact model

Variable variance phenomenon	Autocorrelation
H0: sigma(i)A2 = sigmaA2 for all i chi2 (27) = 162.34 Prb > chi2 = 0, 0000	H0: first order correlation: no F(1,26) = 28,588 Prb > F = 0, 0000

Source: Run results from Stata software

The result of the Prob>chi2 test = 0.0000 is less than 0.05, so we reject H0 to accept H1 or there is a variance change and autocorrelation in the FEM fixed impact model.

Table 6: Defects remediation in the FEM fixed impact model

Independent variable	Dependent Vriable		
	Coefficient: Of regression	Standard Error	P value
SIZE	0.0277	[0040]	0.000
ROE	0.0692	0.0250	.000
LLR	1.2566	1610	.000
phát triển	4357	0.0415	.000
GDP	0.0897	(.0414)	0.232

Independent Variable	Dependent variable		
	Coefficient: Of regression	Standard Error	P value
INF	0.4512	0.0866	.000
không thay đổi	1389	0.0311	.000
Number of observations	258		
Wald chi2(8)	733.11		
chi2	0.0000		

Source: Run results from Stata software

With the dependent variable being NPL after using FGLS to overcome autocorrelation and variable variance, the model is meaningful at 1% significance level (due to Prob =0.0000) so the regression model built is suitable.

Table 7. Summary of research results

Independent variable	NPL			
	Hypothesis	Research results		
	Expected sign	Expected sign	P-value	Managing director
SIZE	+	+	.000	Statistical significance
ROE	-	+	.000	Statistical significance
LLR	+	+	.000	Statistical significance
phát triển	+	+	.000	Statistical significance
GDP	-	+	265	Statistical significance
INF	+	-	.000	Statistical significance
R2	0.6702			

5. Conclusions and recommendation

5.1. Conclusions of the Study

The findings of this research indicate that economic growth does not significantly influence Non-Performing Loans (NPLs) in Vietnamese commercial banks. In developed economic settings, customers' repayment behaviors are primarily driven by their willingness to repay rather than economic expansion. Moreover, the accumulation of overlapping debts within enterprises can impede banks' progress, adversely affecting credit quality and increasing credit risk.

5.2. Policy Implications

The NPL ratio serves as a direct reflection of credit quality, with higher ratios indicating lower quality and increased credit risk for banks. To mitigate NPL ratios and minimize credit risk, Vietnamese commercial banks, the State Bank, and the Government should consider the following strategies:

Firstly, commercial banks must accurately identify and classify NPLs within their institutions, adhering to SBV regulations on debt classification. Transparency in reporting and understanding NPLs is crucial for attracting investors and maintaining credibility. Credit officers must be well-versed in NPL identification to ensure accurate assessments.

Secondly, Vietnamese commercial banks should actively address NPLs through both external and internal measures. Selling debts to the Vietnam Asset Management Company (VAMC) and utilizing internal resources for debt resolution are viable approaches. Establishing a robust debt classification system and seeking SBV support for target achievement are also essential.

Additionally, the State Bank should regulate NPLs in the real estate sector by imposing lending restrictions and encouraging alternative capital sources. The government should establish a legal framework for NPL securitization, facilitating the conversion of overdue debts into bonds or shares to support liquidity and prevent bankruptcy.

Furthermore, tax exemptions on debt trading activities can stimulate the debt trading market, reducing NPL-related losses and encouraging private investor participation without burdening the state budget.

References:

Bui Duy Tung and Dang Thi Bach Van (2015). The influence of internal factors on NPLs of Vietnamese commercial banks. Journal of Economic Development, 26(10), pp. 111 - 128.

Fofack (2005). Non-performing Loans in Sub-Saharan Africa: Causal Analysis and Macroeconomic Implications. World Bank Policy Research Working Paper, No. IMF (2004). Financial Soundness Indicators (FSIs): Compilation Guide.

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. Journal of Financial Stability, 20, pp.93104.

Keeton, W.R. and Morris, C. (1987). Why Do Banks' Loan Losses Differ? Federal Reserve Bank of Kansas City. 72, No.

Nir (2013) 10 biggest banks from 16 economies in Central, Eastern and Southeastern Europe (CESEE) 1998-2011

Messai, A.S. and Jouini, F. (2013). Micro and macro determinants of non-performing loans. International journal of economics and financial issues, 3(4), pp.852-860.

Minh, Tien Cao, and Niki Naderi. "Unleashing the role of green finance, clean energy, and environmental responsibility in emission reduction." Journal of Environmental Assessment Policy and Management 24.03 (2022): 2250033.

Tram Thi Xuan Huong, Hoang Thi Minh Ngoc (2013). Commercial banking curriculum. Ho Chi Minh City, Vietnam: Economic Publishing House of Ho Chi Minh City.

Tien, Cao Minh. "The Relationship Between Capital Structure and Performance of Securities Brokerage Firms-a Case Study in Vietnam." International Journal of Professional Business Review 8.1 (2023): e01208-e01208.

Tien, Cao Minh. "Risk Management Of Financial Reporting And Financial Security Reporting In Vietnamese Securities Companies." Journal of Namibian Studies: History Politics Culture 33 (2023): 941-952.

IMPLEMENTING CENTRAL BANK DIGITAL CURRENCY IN ASIAN COUNTRIES AND LESSONS FOR VIETNAM

PhD. Tran Thanh Thu* - MSc. Nguyen Thi Duyen - Huynh Mai Anh*****
MSc. Le Minh Tuan* - Nguyen Thanh Thuy****

Abstract: ***Central Bank Digital Currency (CBDC) is a new form of currency issued by a country's central bank in digital form. CBDC can benefit a country's financial systems by enhancing financial inclusion, reducing transaction costs, improving currency management efficiency, and combating money laundering. However, CBDC poses many challenges and risks, such as affecting the role of commercial banks, putting pressure on monetary policy, and reducing trust in traditional currencies. This paper aims to survey the experiences of researching, testing, and deploying CBDC in some Asian countries and draw lessons for Vietnam's CBDC development process.***

• Keywords: *CBDC, digital currency, central bank, Asian countries, lessons, Vietnam.*

Date of receipt: 25th December, 2023 *Date of receipt revision: 20th February, 2024*
Date of delivery revision: 27th December, 2023 *Date of approval: 21th March, 2024*

1. Introduction

Central Bank Digital Currency (CBDC) has recently emerged as a disruptive innovation in monetary systems and financial technology. CBDCs are digital representations of a country's fiat currency, issued and governed by the central bank. They can transform existing payment systems, improve financial inclusion, and redefine the monetary policy landscape. As nations worldwide investigate CBDC implementation options, Asia has emerged as a significant region leading this transformative journey. The implementation of CBDCs in Asia has garnered considerable attention due to the dynamic economic landscape, diverse financial systems, and technological advancements. Several Asian countries have embarked on ambitious projects to develop and deploy their CBDCs, each with unique approaches and objectives. These initiatives have sparked a global discourse on the potential benefits, challenges, and implications of CBDCs.

This paper aims to analyze CBDC implementation in Asia, focusing on experiences and valuable insights to inform future endeavors and shape the global understanding of this groundbreaking technology. The first section of this paper will delve into the theoretical foundations of CBDCs, exploring their potential benefits and drawbacks. It will discuss how CBDCs can enhance financial inclusion, streamline payment systems, mitigate risks associated with cash usage, and facilitate more effective monetary policy implementation. Additionally, the paper will point out potential challenges such as privacy concerns, cybersecurity risks, and the need for robust infrastructure.

The subsequent section will overview CBDC projects in selected Asian countries. Each country has adopted a distinct approach to CBDC implementation, reflecting their unique economic and regulatory landscapes. By analyzing these case studies, we can gain valuable insights into the motivations behind CBDC initiatives, the technological frameworks employed, and the potential impact on financial systems and monetary policies. The final section will focus on the managerial lessons for Vietnam in implementing CBDC. Vietnamese government has demonstrated a keen interest in exploring the potential of digital currencies to enhance financial inclusion and promote economic growth. Moreover, in the context of inclusive digital transformation in the financial sector, a comprehensive understanding and implementing of CBDC is compulsory for the financial stability.

We attempt to contribute to the growing body of knowledge surrounding CBDCs by analyzing the current situation of CBDC in several Asian

** Banking Academy of Vietnam; email: thutt@hvnh.edu.vn*
*** Banking Review*
**** Academy of Finance*
***** Petrolimex Aviation*

countries and proposing practical lessons for Vietnam. By understanding the motivations, strategies, and outcomes of CBDC projects in various Asian contexts, policymakers, researchers, and industry professionals can make informed decisions regarding the future of digital currencies and their potential impact on Vietnamese financial systems.

2. Basis on CBDC

2.1. Definition of CBDC

Previous studies approach to the definition of CBDC from different perspectives. According to Adrian and Mancini - Griffoli (2019), CBDC is the digital form of central bank money. The role of central banks in the economy is recognized through issuing central bank's money. The most popular form of central bank's money is notes and coins, which people have been carrying in their wallet for centuries. The digital counterpart of notes and coins is CBDC. Bordo and Levin (2017), Engert and Fung (2017) define CBDC as monetary value stored electronically. CBDC represents a liability of the central bank and can be used to make payment. Bitter (2020) defines CBDC as a potentially interest bearing, centrally issued, account based, digital type of central bank liability that is accessible to the general public. Ozili (2022) stated that CBDC can be defined through the lens of both finance and economics. By financial view, CBDC can be classified under digital finance, a branch of finance exploring the innovations that enables the delivery of financial products and services through digital devices over the internet (Ozili, 2018). CBDC also belongs to monetary economics, which analyzes money, its features, functions and the acceptance of money in the economic system. CBDC is a liability of the issuing central bank. The function of CDBC in the economic system is similar to cash but it holds different physical attributes in comparison to cash. European Central Bank defines CBDC as the digital equivalents of fiat currency, issued by central banks and backed by the full faith and credit of the government. The big difference between CBDC and fiat currency is that no new printing is required when issuing CBDC. Thus, the governments need to establish a new financial infrastructure for CBDC adoption.

US department of the Treasury (2022) considers a CBDC is a digital form of a country's sovereign currency. CBDC would have three core features: legal tender, converted one-for-one into reserve balances or paper currency, clear and settle with finality nearly instantly. The IMF came up with the concept of CBDCs as digital currencies issued and managed by central banks. CBDC is safer and more stable than crypto assets. Although CBDC shares some common characteristics with cryptocurrencies (digital form) and stablecoins (real asset-backed), CBDC is governed centrally under the control of central banks. The Bank of England described a CBDC as electronic money of central banks with four features, including (i) broader accessibility than traditional bank reserves, (ii) greater potential functionality for retail transactions than cash, (iii) has a separate operational structure from other forms of Central Bank money, allowing it to serve a different core purpose potentially, and (iv) can be interest-bearing (Kumhof and Noone, 2018).

In summary, CBDC is a currency in digital form that is issued by a central bank and represents a liability of the issuing central bank. It is the digital equivalent of paper currencies issued by central banks, or fiat digital money of central bank (Ozili (2021).

2.2. Classification of CBDC

A CBDC is a claim-based means of payment, which differs from object-based means of payment. Using object-based means of payment like cash or other form of cash for goods and services, the transaction is settled immediately as long as the parties deem the object to be valid. The flow of physcial commodity and the cash flow come together at the same time. No exchange of information is necessary. In claim-based payment, the transaction is simplied through swiping cards or electronic transaction but it requires a complex infrastructure to ensure the flows of information among different parties in the system.

A CBDC could be an accounted-based or token-based. An account-based CBDC is a CBDC tied in an identity system where a sender first verifies whether the receiver has an account and then verifies the identity of receiver before making a payment transfer. A token-based CBDC is a CBDC tied in an accessible technology. A person verifies the authenticity of the token for every payment transaction. A CBDC token is a digital object that has a given value expressed in the national unit of account and is a claim on the central bank (Armelius et al., 2021).

A CBDC could be a wholesale or a retail CBDC. A wholesale CBDC is like central bank reserves. The central bank opens an account for an institution to deposit funds or use to settle interbank transfers. Wholesale CBDCs could be designed for large - value financial transactions. A CBDC could serve as a settlement asset for digital clearing houses, which could convert one type of digital asset into another, with the CBDC acting as a highly liquid bridge between assets. A retail CBDC could be designed as an alternative to payments using cash, checks, credit or debit cards. A retail CBDC could substitute for cash in low-value transactions, to the extent that it is more convenient, less prone to loss or theft, or has other features preferred by users.

CBDC should pay interest to accelerate the adoption at the early stage. DTL-based system could be both permissioned, meaning the network of nodes that verify or commit transactions would be pre-approved entities, or permissionless, where any entity with requisite technology and capacity could act as a node. Lee at al. (2021) argue that central banks will have to choose the choice of ledger, distributed ledger technology or the traditional central bank infrastructure. Countries that are conversant with the distributed ledger technology will have a competitive advantage in developing a CBDC.

3. Current situation of implemeting CBDC in Asia

3.1. Overview of CBDC implementing process in Asia

Asia is recognized as one of the leading regions in exploring CBDCs. Technology offers various advantages to CBDC but raises significant concerns, encompassing infrastructure, cybersecurity, privacy, fraud, terrorist funding, and money laundering. Therefore, no Asian country has yet launched a fully operational CBDC. Currently, 15 countries are engaged in CBDC research, 10 countries are in the development phase, and 10 countries are conducting trials. Among the 11 ASEAN nations, only Brunei and Timor-Leste still need to articulate concrete plans for CBDC (FinTech Singapore, 2023). Specifically, China and India are leading countries in implementing CBDC. Other countries, including Hong Kong and Singapore, are relatively advanced in their work on CBDCs, while Japan, South Korea, and Australia, have done extensive research.

The driving force of adopting CBDCs varies by country. Higher-income countries seek to improve the efficiency and safety of payment systems while emerging and developing countries seek to promote financial inclusion and financial stability. The decision to adopt or explore CBDCs links closely to the rapid increase in the use of crypto assets and national regulatory efforts. For example, in Indonesia, the Philippines, and Vietnam, the increasing use of cryptocurrencies for money transfers and investments has shown remarkable benefits of technological innovation, including lower costs and improvements in payment systems.

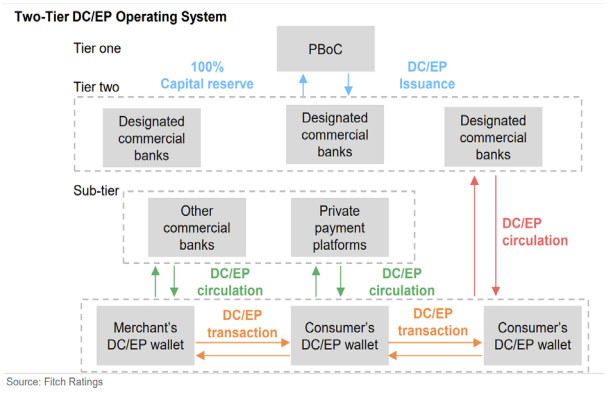
3.1.1. The situation of CBDC in China

People's Bank of China (PBoC) has been researching CBDCs since 2014 and established the Digital Currency Research Institute in 2017. The PBoC has named its CBDC the digital yuan (e-CNY) and has tested DCEP in several major cities such as Shenzhen, Shanghai, Beijing, Chengdu, and Hong Kong. The PBoC has partnered with major tech companies such as Tencent, Alibaba, Huawei, and China UnionPay to develop and improve DCEP.

Nature and Functions of e-CNY: e-CNY is a digital version of China's fiat currency, with all the essential functions of money: unit of account, medium of exchange, and store of value. As China's legal currency, e-CNY is backed by sovereign credit and has the same legal status as RMB banknotes.

e-CNY Two-Level System and Management Model: e-CNY is centrally managed by the People's Bank of China (PBoC) and operates on a two-tier model, with the PBoC issuing e-CNY to commercial banks and authorized institutions that provides exchange and circulation services to the public.

Figure 1: Two-Tier DC/EP operating system



Source: Fitch Ratings

The position of e-CNY as M0 and Parallel Existence with RMB Physical: e-CNY is considered M0 (cash in circulation) and will exist alongside physical RMB. Both forms of money are debts of the PBoC to the public with the same legal status and economic value. The PBoC will issue both e-CNY and physical RMB in parallel and consider data collection, analysis, and daily management.

e-CNY as Retail CBDC and Applications in Retail Payments: e-CNY is classified as a retail CBDC, serving the domestic retail payment needs of the public. It is released to the public for everyday transactions, aiming to improve the efficiency of the retail payment system and reduce retail payment costs. As with Alipay and WeChat Pay, e-CNY can be transacted offline and taken immediately after payment, alleviating the difficulty of an Internet-less environment. E-CNY also has an outstanding advantage over other payment methods.

Interaction between e-CNY and Current Electronic Payment System: e-CNY and funds in electronic accounts of licensed banks and non-bank institutions, complying with legal requirements (including anti-money laundering and counter-terrorism financing), are interoperable and work together with existing payments infrastructure to deliver digital retail payments services to customers. About e-CNY´s "managed anonymity" feature. In principle, e-CNY is anonymous for small-value transactions and can track large-value transactions. The PBoC can detect when someone abuses e-CNY in illegal activities such as phone scams, gambling, money laundering, and tax evasion. That is, e-CNY meets the information security needs of individual customers with a small transaction value and collects less information than other traditional electronic money systems.

The e-CNY project is at the experimental level, with more than 2 billion yuan (about 300 million USD) already released. However, there has yet to be any specific information about the official launch.

3.1.2. The situation of CBDC in Thailand

The Bank of Thailand (BoT) has developed two separate CBDC projects: Multiple CBDC Bridge Project (mBridge), Developing Wholesale CBDC for cross-border transfers, and Retail CBDC for the public.

About mBridge, the Bank of Thailand (BOT), the Central Bank of the United Arab Emirates, the Hong Kong Monetary Authority (HKMA), the Digital Currency Institute of the People's Bank of China (DCI PBC), and the Bank for International Settlements Innovation Hub in Hong Kong are collaborators in the mBridge. This platform increases the efficiency of cross-border transactions using multi-CBDC by doing away with the correspondent banking network. The cross-border transfer time declines significantly, from 3-5 days to several seconds. Moreover, the cost of cross-border transactions was reduced considerably thanks to the ability to establish peer-to-peer links between participating banks. The platform also lowers the risk of settlement and facilitates the usage of local currencies in international transactions. Regarding the retail CBDC, the financial stability, service providers, and the public may all be impacted by the development of Retail CBDC. Hence, the BoT will move carefully and consider the opinions of the public and private sectors when implementing Retail CBDC. Recently, BoT has conducted testing in 2020 in partnership with Siam Cement PCL and Digital Ventures Limited. In 2021, it released a report and asked for feedback from the public. The pilot project for Retail CBDC was undertaken by the German payment services firm "Giesecke and Devrient" (G+D) at the cost of 10 million Baht. The trial of Retail CBDC by the Bank of Ayudhya targeted 10,000 users. Individuals spend money purchasing digital Baths and use digital currency to pay for their consumption through a mobile banking app.

3.1.3. The situation of implementing CBDC in Japan

The Bank of Japan (BoJ) has been experimenting with CBDC since 2017, collaborating with other central banks and private sector partners. The BoJ approach to CBDC is based on three possible functions and roles: (1) introducing a payment instrument alongside cash, (2) supporting private payment services, (3) and developing payment and settlement systems suitable for a digital society. The BoJ has also identified some core features required for CBDC, such as universal access, resilience, and compatibility with other payment services.

To supplement the wholesale project, BoJ aimed to check the feasibility of retail to study the technical function of the main features. BoJ launched a test program with the participation of payment service providers and users. The program

consisted of two stages. Phase 1, starting in the second quarter of 2021, focused on developing the testing environment and core functions. Phase 2 performed additional tasks in the testing environment and the feasibility test.

3.2. The situation of CBDC in Vietnam

3.2.1. Potentials of implementing CBDC in Vietnam

Vietnam is a promising country for implementing CBDC because of two main reasons. First, the scale of the digital economy is expected to reach 49 billion USD by 2025. Only after Indonesia, Vietnam ranks second in ASEAN regarding digital economy growth rate. Digital economic goods contribute 4 percent to GDP, the highest proportion in the ASEAN region. Second, Vietnam is one of the countries with the highest cryptocurrency usage globally (Statista, 2022). The survey of Statista in 2022 showed that 21 percent of Vietnamese respondents said that they used or owned cryptocurrencies, following only Nigeria with 32 percent. Vietnam ranks third in the Global Cryptocurrency Adoption Index 2023 ranking (Chainanalysis, 2023). These figures emphasize that the adoption process is in the growing phase. Cryptocurrencies have become an integral part of Vietnam's economy, establishing a firm basis for the launch of CBDC in Vietnam.

3.2.2. Legal regulations on Cryptocurrencies and CBDCs

Vietnam does not have clear and consistent regulations on cryptocurrencies, virtual assets, and digital assets. According to the Law on the State Bank of Vietnam 2010, the legal currency is Vietnamese Dong, and the State Bank recognizes foreign currencies. According to Decree 101/2012/ND-CP, cryptocurrency is a digital commodity, not a legal currency, and cannot be used as a means of payment. These regulations cause conflicts and difficulties in managing and developing electronic money in Vietnam. In general, current legal documents of Vietnam prohibit the circulation and transaction of cryptocurrency and any virtual currency.

However, in Decision No. 942/QD-TTg dated June 15th, 2021, of the Prime Minister approving the e-government development strategy towards digital government for the period 2021 - 2025, with an orientation to 2030, the State Bank of Vietnam was assigned to the task of researching, building and piloting virtual currency based on Blockchain technology. A national digital currency research board was established under the governance of SBV. Thus, the Vietnamese government and SBV approach the CBDC implementation prudently and steadily.

3.2.3. Technology Infrastructure

(i) Blockchain technology in Vietnam

Cryptocurrency trading platforms and smart contract execution are built on a new blockchain technology. The legal status of blockchain is regulated in Decision No.2117/QD-TTg, issued on December 16, 2020, by the Prime Minister. Blockchain ranks second, preceded only by AI technology, in the critical national technology program until 2025. Being a pillar for the Vietnamese inclusive digital transformation, blockchain offers many applications, especially in financial services. Mai et al. (2017) indicated that around 3,000 start-up companies in Vietnam were blockchain-related. MarketsandMarkets report emphasized that the magnitude of blockchain-related market value would reach nearly 2.5 billion USD by 2026, increasing five times compared to 2021. The founders of 7 companies in the top 200 companies based on blockchain technology are Vietnamese. On May 17th, 2022, the Vietnam Blockchain Union, the first official legal entity in blockchain technology, was launched to make Vietnam a top global technology hub. However, the limited public awareness of blockchain and the shortage of legal basis set a barrier to the adoption of blockchain in Vietnam.

(ii) Smartphone coverage and network development

The technical infrastructure is a critical factor in implementing CBDC. Smartphones are a popular technology product that Vietnamese people widely use. Statista says smartphone users are about 65.58 million (ranked 15th globally in 2022). The proportion of smartphone users in Vietnam is estimated to be 68.2% in 2021, with about 66.9 million smartphone users. Vietnam ranks 9th in the world and 3rd in Southeast Asia in the number of smartphone users, just behind Indonesia and the Philippines. Vietnam's 4G broadband mobile phone coverage rate has reached 99.8 percent of the population. In high-income countries, this

rate averages 99.4%. Vietnam is also preparing to auction 5G frequencies and deploy 5G networks on a large scale by 2024. According to the latest study on payment attitudes of Vietnamese consumers in 2022, which was just announced by Visa, electronic payment and digital trends continue to grow as 90% of Vietnamese consumers carry out non-cash transactions in 2022.

4. Recommendations for implementing CBDC in Vietnam

Central Bank Digital currencies have the potential to transform existing payment methods and enhance financial inclusion. The official launch of CBDC in Asia is a big step forward in the global discussion on this disruptive technology. Examining CBDC programs in many Asian nations can provide helpful insights to inspire future efforts and shape global awareness of this revolutionary breakthrough. Case studies have demonstrated the various techniques taken by different nations in adopting CBDC, reflecting their distinct economic and regulatory environments. These initiatives have emphasized CBDC's potential benefits in streamlining payment processes, strengthening monetary policy enforcement, and lowering hazards connected with cash use. However, they expressed worries about privacy, cyber security, and the need for a robust infrastructure.

Vietnam has offered several advantages for the growth of CBDC. However, Vietnam encountered certain obstacles during the implementation of CBDC. Research and issuance of CBDC are inevitable trends, so it is necessary to have critical solutions to provide Vietnam's official views and roadmap for central bank digital currency.

4.1. Finalizing cryptocurrency policies and legislation

Unify the name and give a specific definition for cryptocurrency: The goal of establishing a Central Bank Digital Currency (CBDC) in Vietnam necessitates standardizing the nomenclature for cryptocurrencies. Clearly defining cryptocurrencies is essential to preventing confusion and coordinating regulatory activities. Vietnam can guarantee that CBDC and other cryptocurrencies are appropriately handled within the legal framework and protect the interests of both users and authorities by offering a precise and uniform definition. Additionally, it will open the door for more logical control and regulation.

Research on the recognition of CBDC as a means of payment: It is essential to carry out thorough research on accepting CBDC as a payment method for Vietnam to implement the CBDC. Comprehending the financial and economic ramifications of integrating CBDC into the payment system is crucial. It can facilitate innovation in the payment sector, lower transaction costs, and improve financial inclusion. To protect consumers and preserve financial stability, taking precautions against potential hazards, such as fraud and money laundering is crucial.

Recognition of cryptocurrencies as a conditional type of property and circulation sets tax regulations: A key component of CBDC integration in Vietnam is recognizing cryptocurrencies as a conditional form of property and setting precise tax laws. By doing this, the government can guarantee that cryptocurrency taxes are acceptable, encouraging openness and generating income. Furthermore, classifying cryptocurrencies as property makes it possible to defend against illegal activity and enforce property rights. Straightforward and well-designed tax laws would help companies and individuals utilizing cryptocurrencies by promoting responsible usage and deterring illicit activity and tax evasion.

4.2. Enforcing the supporting factors for CBDC implementation

Raising awareness of blockchain technology in Vietnam: Implementing CBDC in Vietnam will require more public understanding. Thus, educating the public about technical issues and emerging technologies is essential. As a result, the FinTech ecosystem will become more knowledgeable and tech-savvy, facilitating the growth and uptake of the CBDC.

Human resource training and infrastructure investment for CBDC development: The success of CBDC implementation in Vietnam depends on labor competence and technical infrastructure. Providing high-quality training courses focused on blockchain and digital currency technologies is crucial to guarantee the efficient creation and management of CBDC infrastructure. Additionally, funds should be set up to construct a reliable and secure technical infrastructure. Digital payment methods, blockchain networks, and cybersecurity safeguards are all included in it.

4.3. Focusing on regulating and supervising CBDC

Establish a Governing Body: The government needs to assign a specialized governing body to supervise and manage the operations of CBDCs. This organization ought to be able to establish and implement policies, carry out audits, and guarantee adherence to know-your-customer (KYC) and anti-money laundering (AML) laws. As a result, investor protection and market stability will be improved, and a well-defined framework for using digital currencies in Vietnam will be established. Moreover, governors and officials need training to keep up with emerging technologies. They must master the features and dangers of new technologies for financial security and stability.

4.4. Strengthen cooperation in CBDC issuance and monitoring

Enhance international cooperation and exchange of information with central banks of countries' international financial and monetary institutions: Work closely with other nations' central banks and global financial and monetary organizations to exchange best practices, insights, and information about issuing and overseeing CBDCs. Vietnam can improve its standing in the changing financial landscape and stay abreast of global trends about digital currencies by forming international alliances.

Respond to and participate in the initiatives to establish a global digital currency management and supervision system: Engage actively in projects to create a worldwide framework for managing and supervising digital currencies. Through cooperation, Vietnam can contribute to global standards and laws, guaranteeing that CBDCs may function effortlessly across borders while abiding by fundamental regulatory requirements.

Strengthen international regulatory and supervisory measures for cross-border cryptocurrency and CBDC transactions: For international digital currencies and CBDC transactions, create and put solid international regulatory and supervisory frameworks into place. This will make cross-border transactions safe and effective while assisting in the fight against possible illegal activities like money laundering and financing of terrorism. Establish a coordinated strategy to address global issues about digital currencies by international collaboration.

References:

Alisha C. (2023). Snapshot: Which countries have made the most progress on CBDCs so far in 2023.

Adrian, T., Mancini - Griffoli, T. (2019). The Rise of Digital Money, IMF Working Paper Series.

Armelius, H., Claussen, C. A., & Hull, I. (2021). On the possibility of a cash-like CBDC. Sveriges Riksbank Staff memo.

Barrdear, J., & M. Kumhof (2016). The Macroeconomics of Central Bank Issued Digital Currencies. Staff Working Paper No. 605, Bank of England.

Bitter, L. (2020). Banking Crises under a Central Bank Digital Currency (CBDC). Conference Paper, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2020: Gender Economics, ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

Bordo, M. D., & Levin, A. T. (2017). Central bank digital currency and the future of monetary policy (No. w23711). National Bureau of Economic Research.

Buchholz, K. (2021) 'How Common is Crypto?,' Statista Daily Data, 17 March. https://www.statista.com/chart/18345/crypto-currency-adoption/.

Carapella, F. (2020) Central Bank Digital Currency: A Literature review.

Engert, W., & Fung, B. S. C. (2017). Central bank digital currency: Motivations and implications. Bank of Canada Staff Discussion Paper, No. 16

Hoang, T.T.T., Vu, T.H.A, Nguyen, M.S. (2022). The Central Bank Digital Currency: World's Experience, Lessons for Vietnam. Banking Review.

https://tapchinganhang.gov.vn/tien-ky-thuat-so-cua-ngan-hang-trung-uong-kinh-nghiem-the-gioi-va-bai-hoc-doi-voi-viet-nam.htm.

Keister, T., & C. Monnet (2020). Central Bank Digital Currency: Stability and Information. Working Paper.

Kumhof, M., & Noone, C. (2018). Central Bank Digital Currencies - Design principles and balance sheet implications, Social Science Research Network.

Lee, D. K. C., Yan, L., & Wang, Y. (2021). A global perspective on central bank digital currency. China Economic Journal, 14(1), 52-66.

Kumar, A. (2022). A Report Card on China's Central Bank Digital Currency: the e-CNY.

Srinivasan, K. (2022). Opening remarks at Peer-Learning series on Digital Money/ Technology: Central Bank Digital Currency and the case of China, IMF.

Ozili, P.K. (2018). Impact of digital finance on financial inclusion and stability. Borsa Istanbul Review, 18(4), 329-340.

Ozili, P.K. (2021b). Central bank digital currency in Nigeria: opportunities and risks. Available at SSRN 3917936

Ozili, P.K. (2022). Central bank digital currency research around the World: a review of literature. Journal of Money Laundering Control.

PricewaterhouseCoopers (20/9/2021) Central Bank Digital Currencies (CBDC): What can Vietnam learn from others in Asia?

Asian Development Bank (2023). Recent Central Bank digital currency developments in Asia and their implications.

Sun, T., & Rizaldy, R. (2023). Some Lessons from Asian E-Money Schemes for the Adoption of Central Bank Digital Currency, IMF Working Papers 2023/123.

Smartphone users by country 2022 | Statista. (2023, May 4). Statista. https://www.statista.com/statistics/748053/worldwide-top-countries-smartphone-users/

Team, C. (2023, November 29). The 2023 Global Crypto Adoption Index: Central & Southern Asia are leading the way in grassroots crypto adoption. Chainalysis.

https://www.chainalysis.com/blog/2023-global-crypto-adoption-index/

Mancini-Griffoli, T., Peria, M.S.M., Agur, I., Ari ,A., Kiff, J., Popescu, A., & Rochon, C. (2018). Casting Light on Central Bank Digital Currency, IMF Working Paper Series SND/18/08.

Bank of Thailand, Thailand's progress and development of CBDC. https://www.bot.or.th/en/financial-innovation/digital-finance/central-bank-digital-currency/Whatarethebenefits/developmentofcbdc.html

The Bank of Japan's approach to Central Bank Digital currency: Bank of Japan (October 2020). https://www.boj.or.jp/en/about/release_2020/rel201009e.htm.

US department of the Treasury Report (September, 2022). The Future of Money and Payments, Report Pursuant to Section 4(b) of Executive Order 14067.

Williamson, S. (2019). Central Bank Digital Currency: Welfare and Policy Implications. Technical Report.

Working Group on E-CNY Research and Development of the People's Bank of China (July 2021) Progress of Research & Development of E-CNY in China.

Soderberg, G., Bechara, M., Bossu, W., Che, N.X., Davidovic, S., Kiff, J., Lukonga, I., Macini-Griffoli, T., Sun, T., & Yoshinaga, A. (2022). Central bank digital currency behind the scenes: emerging trends, insights, and policly lessons.

EFFORTS TO PROMOTE DIGITAL TRANSFORMATION TOWARDS BUILDING JAPAN'S DIGITAL GOVERNMENT, DIGITAL SOCIETY, AND DIGITAL ECONOMY

PhD. Nguyen Thanh Thao* - Assoc.Prof.PhD. Luu Ngoc Trinh**

Abstract: ***Acknowledging its delay in the race of "digital transformation" and determining the need to quickly digital transformation to overcome this backwardness is an inevitable trend, a vital issue for the country of the rising sun; the article is considered from a number of factors affecting digital transformation in Japan, analyzed 5 reasons to slow down the current digital transformation process and presented 3 major challenges that hinder Japan's digital transformation, thereby proposing seven solutions to promote digital transformation in Japan towards building a sustainable digital government, digital society and economy in the future, maintaining the position of the world's third largest economy.***

• Keywords: *digital transformation in Japan, digital society, digital economy, digital.*

Date of receipt: 19th October, 2023 *Date of receipt revision: 05th January, 2024*

Date of delivery revision: 20th October, 2023 *Date of approval: 15th January, 2024*

1. Some factors affecting digital transformation in Japan

- On the current state of the economy. Over the past three decades (since the early 1990s), Japan's economy (the third largest in the world) has always been in a stagnant state, with growth rates far below those of decades after the Second World War, even many years of growth below potential. As a result, from the world's second economic superpower after the United States, since 2010, Japan has been surpassed by China, and so far, Japan is still grappling with half-hearted reforms in an attempt to break free from the state of low growth. In addition, the economy also faces long-term difficulties due to an aging population, leading to a shrinking workforce, low labor productivity growth and major risks related to climate change.

- On digital transformation in Japan. Despite being one of the world's largest users of industrial robots and the home of The electronics industry[1], Japan still lags behind other economies in digitizing businesses (which, for example, continue to depend on old IT systems, governments, and the financial sector.)

- Currently, in many countries, even in some developing countries, it is common for people to receive many daily services with just a smartphone. On the contrary, in Japan: First, many administrative procedures are still mainly handled through a large number of papers and people, if they want to register for public services, have to go through many different departments; Secondly, many central and local government offices use different systems to store and manage data, because each agency builds its own, so the systems are heterogeneous and lack compatibility. Such processes place a tremendous burden on people to spend their precious time to complete such procedures, and there are countless other difficulties… [ictvietnam.vn, 2019].

The fact that government services have not yet fully and appropriately digitized has become a major problem during the pandemic: Causing delays in handling people's aspirations for grant applications and emergency financial support, as well as slowing down the transmission of medical data needed for virus prevention measures; many workers have struggled to switch to remote work when the pandemic began, reducing economic output and productivity at a critical time; incomplete and consistent digitization across systems has also caused delays in many schools at the beginning of the pandemic when it comes to online learning; and the adoption of non-cash payments and e-commerce has also been slowed...

[1] *According to METI, Japan is currently the world's leading supplier of industrial robots, with an income of 340 billion yen in 2012, accounting for over 50% of the global robot market, 90% of the important robot market share, especially in the precision industry and force sensors [Nguyen Nham, 2017].*

** Academy of Finance; email: thanhthaonguyenntt@hvtc.edu.vn*

*** University of Transport Technology; email: lntrinh57@yahoo.com*

- Japan still prefers to use traditional technology.

While many countries have embarked on the digital transformation process for many years, in Japan, many old technologies are still widely used.[2]

According to Professor Parissa Haghirian (Sophia University, Tokyo), most offices in Japan are still using fax machines to exchange work. Even the tradition of widely using personal seals (hanko), in place of personal signatures and digital signatures, is still popular in Japan.

Digital banking, electronic banking - a popular method of banking transactions in many countries - was introduced nearly a decade later than many other countries, even so many Japanese banks still do not have this application. Most Japanese citizens still use small bank books instead of online banking applications like other advanced countries. Surprisingly, recently, a government committee has discovered about 2,000 administrative procedures still requiring applications or forms on floppy disks, CDs, MDs, even cassettes [Phan Van Hoa, 2022].

Such a situation of digital transformation leads to the idea that Japan is still only a country that is fully automated and mechanized, not a "digital society", or maybe just a form of society that has been "digitally transformed in a half-hearted way". As evidenced by "many vestiges of work that could have been digitized and managed more effectively, thereby improving work efficiency, are still done by hand, as elderly people with fading eyesight and trembling fingers carefully trace each line of text to feel for customer information. Especially in administrative management, real estate, banking, taxation, education..." [Minamikawa Famu, 2021]. In recent years, although Japan has begun to promote digital transformation and minimize administrative procedures, it is notable that the My Number personal code was born to create a premise for the next movement steps. However, that may start a little late, as Japan has missed out on the "smartphone revolution", and let South Korea and China leapfrog it, especially in Big data and artificial intelligence (AI). While QR code payment has been very popular in China for 4-5 years, in Japan it has only started in the past 2 years with a limited percentage of users and is currently in an acceleration phase. The Japanese leadership has also recognized this, and is rushing to reform to avoid falling behind [Linh Anh, 2021].

[2] *TechinAsia (2016), Easy to recognize Japan as a country with a developed technology background with a lot of jobs that have been recognized by robots. Eventhe toilets in the country are equipped with smart devices. However, the Japanese still prefer some old technology products, such as CDs, Paper newspapers, Fax machines, DVD rental services and flip phones.*

- For the semiconductor industry, after "more than three lost decades", Japan's share of the global chip market has fallen from half (about 50.3%) in 1988 to 10% in 2021, with the risk of falling to 0% by 2030, according to the Japanese Ministry of Industry. Its customers fall into the hands of rivals with lower prices, such as South Korea, Taiwan and China [Linh Anh, 2021]. "Japan has lost out to Taiwan, South Korea and China in semiconductor investment," said Maitani Masato, senior manager at Mitsubishi UFJ Research and Consulting. "In the development of advanced semiconductors, we are 10-20 years behind," said Koike Atsuyoshi, president of Rapidus Chip Manufacturing. This is the last chance to take advantage of the country's manufacturing advantages to contribute to the world" [World Today, 2023].

- Once proud to be a world leader in outstanding advances in technology, but today, Japan is at risk of being/or even being overtaken by many countries in the field of semiconductors and digital transformation. According to the Digital Competitiveness Index of the International Institute for Management Development, in 2022, Japan ranked 29th, down 1 place from 2021, among 63 countries and territories examined, behind South Korea (12th) and China (15th) [Minh Ngoc, 2022].

In the face of that tragic situation, during the meeting of the ruling Party (LDP - Liberal Democratic Party of Japan) in May 2021 on the issue of bringing Japan to the leading position in the digital economy, it was necessary to call: "We cannot continue what we are doing. We have to do something on a completely different level" [Linh Anh, 2021].

- Tsuneo Fujiwara, Vice President of global technology research and consulting firm Gartner based in the US, said that in 2018, the Japanese government realized that it needed to do digital transformation, otherwise, the country could suffer economic losses of up to 12 trillion yen (about 71.6 billion pounds) per year [Phan Van Hoa, 2022].

2. Reasons Japan is slow in digital transformation

Firstly, from a cultural perspective

- According to senior researcher Jun Mukoyama (at the Asia-Pacific Initiative), the tradition of valuing the elderly and patriarchy in Japan is a major obstacle that makes it more difficult to eliminate outdated technology. Standards are largely dictated by the most senior leaders in an organization, who prefer the old approach and the risk-averse and infallible nature of

government officials that also slows down the process of change.

- In order to realize the digital transformation process, Japan's Ministry of Digital Affairs has announced digital governance rules, encouraging companies to launch digital transformation projects.

Like in any country, implementing digital transformation will help modernize the country of Japan. Digital transformation could once again ignite the culture of innovation that the country has lacked for the past 30 years.

Japan is known for its strong innovation after World War II, which has created an economic "miracle" and rapid development in science and technology (S&T) after the war, but in recent decades, Japan has only made improvements to existing processes rather than implementing new, revolutionary ideas.That means, for many years, Japan completely lacked a "culture of innovation" [Phan Van Hoa, 2022].

Secondly, there have also been many changes in the leadership of the Japanese government over the past time. Mr. Yoshihide Suga (LDP) is the Prime Minister who strongly supports digitalization and digital transformation. After Mr. Suga was elected Prime Minister in September 2020, he immediately established the Ministry of Digitalization of the government, but unfortunately he resigned only one year later. After Yoshihide Suga's resignation, Japan's first Minister of Digital Affairs, Yoko Ishikura, was also forced to resign. In addition, it seems that other ministries often ignore the recommendations made by the Ministry of Digitalization on how to digitize internal processes [Phan Van Hoa, 2022].

Third, the perception of digital transformation is not quite right. In the era of rapid development of digital technology, DX (Digital Transformation) has become an important trend in the global business environment. It is worth noting here that, while in other countries DX is not limited to the business sector only, but also includes the process of applying digital technology to all aspects of social and economic life, of the organization, from business operations to the management of personnel, customers and also production processes, in Japan, the DX concept is mainly known in the business sector through METI's "DX Promotion Guide" published in 2018, which shows a limited view of DX and often limits it to the business sector.

Fourth, the fixed nature of labor and employment of employees. In general, Japanese businesses do not change jobs often, which means that they will not notice many changes in the internal process based on previous experience from the company, so everything is still the same.

Fifth, population ageing. Over the past few decades, Japanese society has been increasingly aging, causing IT-intensive human resources to be limited, making it difficult for businesses to develop new "digital platforms" based on IT. Statistics show that in 2021, Japan had 36.21 million people over 65 years old, accounting for 28.9% of the population, much higher than the US (16.6%), Sweden (20.3%), France (20.8%) or Germany (21.7%). These people make up the majority of the leadership in agencies and businesses and remain loyal to traditional technologies that have existed for decades. Therefore, the abandonment of these traditional technologies is not an overnight but will take years in Japan. At the same time, according to Professor Haghirian, the current decision-making power in agencies and businesses is often old people, so it is difficult to accept the change. On the other hand, many customers are also older, so they do not feel comfortable using new systems or applications of technology. However, they have time to go to the offices and banks in the city to do the procedures in person instead of having to rely on online services. Therefore, Professor Haghirian said: in that context, the Japanese government is difficult to abandon the use of outdated technologies. And for successful digital transformation of public services, the government needs to have an overall long-term strategy for the whole country, managed and implemented by IT professionals [Thuc Linh, 2023].

3. Some challenges of digital transformation in Japan

Although Japan has made encouraging strides in digital transformation in the past, the country continues to face certain challenges, requiring a lot of time, effort and money. The biggest challenges that can be mentioned are:

First, the challenge of traditional culture. Japanese people and in particular Japanese businesses tend to prioritize stability and trust in traditional processes. These processes usually work very well and have been proven to be effective throughout the business. Therefore, changing and introducing new processes based on digital technology can cause discomfort and difficulty for employees and management.

Parallel to that, Japanese businesses often tend to be cautious and concerned about risks when making

the decision to switch from a traditional business model to a new business model associated with digital technology. The feeling of uncertainty and fear of failure in the implementation process makes Japanese businesses delay the decision and spend a lot of time to consider before implementing.

Secondly, the challenge comes from a rapidly ageing society, making the supply of high quality labor, including information technology and digital transformation human resources.

- According to the Japanese government, 1 in 10 residents is 80 or older, equivalent to 10% of Japan's population currently over the age of 80, which is the latest worrying milestone in the demographic crisis in this rapidly aging country. As for the Japanese Ministry of Internal Affairs and Communications, the proportion of elderly people in Japan aged 65 and over reached a record high of 36.17 million by September 2023, an increase of 300,000 people compared to a year earlier, accounting for 29.1% of the population, reaching the highest level in the world, and tending to increase (predicted to account for 35.3% by 2040).

At the same time, Japan also has one of the lowest birth rates in Asia over the past few decades with a birth rate that has plummeted to 1.3 births per woman, well below the 2.1 needed to maintain a stable population in the absence of immigration. Along with that, the labor supply is shrinking, which may affect the funding for pensions and health care as the demand from the aging population increases [Thuc Linh, 2023].

- In particular, the supply of human resources with an understanding of information technology and high technical skills for digital technology and digital transformation is even more alarming. Currently and for many years to come, the demand for this type of manpower is outpacing the supply capacity of the current labor market, including programmers, artificial intelligence specialists, data specialists and cybersecurity experts, etc.

The serious shortage of suitable high-quality human resources will certainly remain a major obstacle to Japan's digitalization, causing many consequences for the country. According to the Ministry of Economy, Trade and Industry, it is expected that there will be about 1.13 million people working in the IT industry by 2030, which means a shortage of about 790,000 people [Hoang Ha, 2023].

Thirdly, the challenge comes from investment capital. Although Japan is the world's third economic power, finding investment resources to bridge the gap in semiconductors, information technology and digital transformation with leading countries in this field is not easy.

- First of all, at the macro level, to revive the semiconductor manufacturing industry, promote information technology, develop digital government, digital society and digital economy, digital citizens,etc. also require a large amount of money, while the Japanese economy is stagnating for many years, resources are not as abundant as before, so it is difficult to compete with the United States, China, even South Korea, and Germany in investing in this field? Although cloud computing has been a focus of investment in information technology recently; however, with investments in cloud computing accounting for only 4% of Japan's total information technology spending in 2021, Japan is lagging behind many countries [Phan Van Hoa, 2023].

- At the micro level, ie the costs necessary for a business to start implementing digital transformation, not all businesses (large and small) can meet and boldly deploy investment. The cost of digital transformation of an enterprise includes many contents, such as: (1) Investment costs in technology application: investment in strategy, human resources, technology solutions,... This will not be a small investment and can be a significant financial burden for small and medium enterprises (SMEs), currently accounting for 98% of the total number of enterprises in Japan; (2) The costs of changing processes and training personnel, is also one of the challenges that small and medium enterprises often face. Therefore, so far, Japan has been a drowning country in the digital transformation race, which is due to the fact that many businesses often do not allocate enough budget for the digital transformation process, significantly hindering the implementation of the transformation at present and in the future.

4. Solutions to develop digital government, digital society and digital economy in Japan

4.1. Dismantling old technology to enter the digital era

- Recently, the new Minister of Digital Taro Kono has officially spoken out and declared war on the use of floppy disks, CDs and even cassettes in Japan. Through the discovery of a government committee, nearly 2,000 administrative procedures are still required to submit applications or forms on floppy disks, CDs.

In early August 2022, at his inauguration as Minister of Digital Affairs, Mr. Kono was outspoken in his criticism of the use of fax machines and "hanko" marks in paperwork related to the COVID-19 pandemic. With the emergence of the internet and cloud computing, Minister Kono is trying to eliminate these outdated technologies to switch to using online applications. It is the Digital Ministry's responsibility to examine and review national public service processes and procedures. The country's Digital Agency hopes to introduce a bill revising all those regulations by 2023, while guidelines that do not require legal amendments will be revised in 2022.

Currently, this Ministry is reviewing and re-evaluating about 60,000 regulations and administrative procedures related to the regulation of data storage on floppy disks in specific processes so that they can be transferred to online storage.

At the same time, in 2021, the Japanese government implemented a cleanup of fragmented or non-standardized data to create accurate, unified, and reliable databases.

In addition, the government also outlined inter-ministerial roadmaps to plan for the coming years and build a Personal Number System called My Number, which is part of the digital tax and social security code system. With the above steps, it is hoped that the digital transformation process will be carried out more smoothly in the coming years in Japan.

4.2. Promote the development of science and technology in general

In order to promote science and technology development, in January 2016, the Japanese Government announced the "5th Science and Technology Basic Plan 2016-2020", which proposes to build a super-smart society or "Society 5.0" capable of providing customized solutions through the application of new technologies such as artificial intelligence (AI), robots, big data and drones, etc. That idea is based on the rapid development of current information technology that allows to establish the combination of cyberspace - information with the physical space - the real world. Strengthening the connection and combination of information between Cyber-Physical System (CPS) and real world entities is expected to bring about great change to Japanese society [Phuong Ha, 2023].

According to a report by UK data analytics and consulting firm GlobalData, the "Society 5.0" initiative will boost Japan's Internet of Things (IoT) -based information technology solutions market from 42.1 billion USD in 2021 to 60 billion USD in 2026, with a compound annual growth rate of 7.4% over the period. In particular, the manufacturing sector, related to the use of robots and automation, will account for 13.1% of the revenue of The information and communication technology (ICT) market in Japan [Phan Van Hoa, 2023].

4.3. Establishment of a digital agency to promote the country's digital ambitions

In order to become a developed country leading in digital government, digital economy and digital society. In September 2021, Japan established a Digital Agency with the task of basically solving e-Government issues through digitizing public administrative procedures and promoting standardization and coordination of data systems; in order to focus on reforming the old and outdated governance systems of government agencies, the system has clearly shown many shortcomings and inadequacies in responding to the COVID-19 pandemic.

An important task of the Digital Agency is to solve the problems of fragmentation and overlap in public administration systems. The agency aims to drastically improve the level of data connectivity of individual government organizations, helping to increase efficiency in their services and operations. The Digital Agency also focuses on leveraging the expertise of the private sector by actively using these professionals, so that there will be a more flexible and fast approach, compared to what has been done in the past. In that way, the Digital Agency is expected to be the one that promotes two-tier e-Government (national and local) - and improves the performance of government agencies. Digital Agency is responsible for eliminating previous inefficiencies and focusing on the value of "improving people's daily lives", enhancing the security of data and systems, and providing a platform for collective governance efforts, the agency will speed up digitization in a user-oriented manner [Bao Thoa, 2021].

- "Currently, the Japanese Digital Agency is encouraging local governments to fully switch to government cloud computing services by fiscal 2025. A full shift to cloud computing could reduce annual IT spending by about 30%, which currently stands at about 800 billion yen (7 billion USD)'', one official said.

4.4. Identify 5G technology as a key enabler for digital transformation

Japan has been promoting the development of 5G technology in industrial markets and other use cases

to positively impact its economy. According to the Yomiuri Newspaper, the Japanese government aims to increase 5G coverage nationwide, from a rate of only 16.5% by the end of fiscal 2020, rising to 98% by the end of fiscal 2023. To accomplish this goal, the Japanese government has decided to support enterprises in the development of 5G telecommunications technology in urban areas through reducing VAT by 9% in 2022, 5% in 2023 and 3% in 2024. Meanwhile, 5G telecom technology development enterprises in local areas maintained at 15% in 2022, but then decreased to 9% in 2023 and finally decreased to 3% in the same way as urban areas in 2023. Besides reducing taxes, the Japanese government will also set aside a subsidy for businesses to develop 5G technology, according to Nikkei. However, in order to qualify for tax reduction and receive subsidies, businesses must meet requirements such as having a safe and reliable development plan, ensuring a stable supply, meeting international standards. The goal of this program is to quickly disseminate domestic 5G telecommunications network towards promoting local digitalization, independent of Huawei products, ensuring cybersecurity [Long Nguyen, 2021].

- Besides continuing to promote the development of 5G technology, the Japanese Government is funding the research and development (R&D) of the next generation mobile technology (6G) in the future. Specifically, since the beginning of 2020, Japan has started to have discussions and deployments on 6G technology. In order to realize the goal of developing and commercializing 6G technology, the Japanese Government is expected to invest 50 billion yen (about 482 million USD) to promote the R&D of this new technology. With the goal that the Japanese Government will focus on developing core network technologies for 6G systems by 2025 and commercially deploying this technology by 2030 [Phan Van Hoa, 2023].

4.5. Invest resources to eliminate the digital imbalance between urban and rural areas.

At the Cabinet meeting on December 14, 2022, the Japanese Government for the first time mentioned a "comprehensive strategy to promote digital transformation" to address development imbalances between urban and rural areas.

Prime Minister Kishida's government plans to spend 5.7 trillion yen (42.5 billion USD) on digitization programs, including building a "digital superhighway" of Japan's submarine cable system for high-speed data transmission within three years, recruiting 250,000 new technologists each year to build an IT force of 2.3 million to accelerate digitization in Japanese society, especially in rural areas [Eicky Ho, 2022].

The above strategy and investments are mainly aimed at: "addressing the imbalanced development between large urban areas and other localities of Japan", especially the concentration of large companies and young human resources in the Capital Region (including Tokyo and three neighboring provinces, Chiba, Kanagawa and Saitama). The policy of the comprehensive strategy is to promote digital development to increase remote working opportunities under the motto: "change accommodation but not change jobs".

In addition, a series of preferential policies will be implemented to create maximum conditions for startups in rural areas, including: attracting diverse human resources, bringing more business opportunities in remote areas of Japan.

In June 2022, Japanese Prime Minister Fumio Kishida announced the basic contents of the "Digital Country, Urban and Rural" initiative, in order to effectively deal with the aging population, declining birth rate, overcrowding in urban areas and lack of development resources in rural areas. With the goal of: "doubling the investment in digital transformation of both the public and private sectors", this concept is positioned as an important growth strategy and one of the pillars to promote a digital society in Japan [Pham Tuan, 2022].

4.6. Promote the revival of the semiconductor industry

- Identifying the semiconductor manufacturing industry as a spearhead, playing an important role in future technologies from artificial intelligence (AI), Japan has advocated investment to restore its leading position in this field. In fiscal year 2023, the Japanese Government will allocate 1,990 billion yen (13 billion USD) to support the promotion of the chip manufacturing industry [VTV.vn, 2023]. In addition, METI proposed an additional budget of 1.85 trillion yen for chip-related subsidies. The subsidy package is part of a broader blueprint to revive Japan's economy.

- Regarding this issue, Japanese media reported that some funds are expected to be used to support semiconductor manufacturing company - TSMC (Taiwan Semiconductor Manufacturing Company) and chip manufacturing joint venture Rapidus. Specifically, Tokyo has decided to support half of the cost of building TSMC's chip plant in Kumamoto

Prefecture and continue negotiations on the level of support for the company's second chip plant. Earlier this year, Nikkan Kogyo newspaper reported that TSMC plans to invest more than 1 trillion yen (6.6 billion USD) to build a second chip plant in Japan. The plant will produce high-end chips in 5 nanometer (nm) and 10 nm sizes. The Japanese government is also willing to provide about 1.5 billion USD to fund the expansion of Micron Technology's Hiroshima plant. In addition, by the end of 2022, the Japanese government said it would invest up to 70 billion yen (nearly 462 million USD) in startup Rapidus (a joint venture between Toyota, Sony and six other companies including chipmaker Kioxia, electronics and semiconductor firm Tokyo Electron, SoftBank Investment Group, automotive parts company Denso, telecommunications company NTT, information technology and electronics group NEC). Rapidus was founded to develop the next generation of high-end chips with a size of 2 nanometers. The move, along with previously announced aid of up to ¥46.5 billion, will contribute to Japan's efforts to secure a steady supply of chips [VTV.vn, 2023].

4.7. Developing high-quality human resources for digital transformation

Identifying the lack of high-level human resources with digital skills as one of the reasons for its lag in this field in recent years, investing in building a digital skills force is considered by Japan as a decisive factor for the success of the digital transformation strategy, to create success: digital society, digital economy, and digital government in the future, and to bridge the digital divide between urban and rural areas; between regions, thereby promoting the country's economic growth.

The government has encouraged universities to establish and expand training faculties in digital technology and digital transformation, and hopes that technical colleges and vocational schools will play a fundamental role to develop the digital workforce. The Ministry of Education, Culture, Sports, Science and Technology has spent 62.5 billion yen to upgrade 57 state technical colleges in the fiscal year 2022/2023. These funds will help promote the development of technology human resources. However, since there are only 57 technical colleges (both public and private), Japan needs to make effective use of the country's approximately 2,700 vocational and professional schools in training digital human resources [Hoang Ha, 2022].

Conclusion: Japan, the world's third largest economy, is grappling with half-hearted reform to find a way out of decades of stagnation. Digital transformation is the basic solution and has an important boost to bring Japan back to the world economic superpower. To do so, the Japanese Government needs to carefully study the reasons why the country is slow to implement digital transformation, the challenges and factors affecting this process. At the same time, in the coming time, Japan needs to well implement some of the following solutions: eliminate the old technology, develop science and technology, develop 5G technology, establish a digital agency, implement a reasonable investment policy to create a digital balance between regions, focus resources on the semiconductor industry and have a reasonable policy to develop high-quality human resources for digital transformation.

References:

Linh Anh (2021), Japanese chip technology: The dying aura gives way to the obsession to be left behind. https://cafef.vn/cong-nghe-chip-nhat-ban-hao-quang-lui-tan-nhuong-cho-cho-noi-am-anh-bi-bo-lai-phia-sau-20210818183641108.chn, updated on August 18.

Minamikawa Famu (2021), Digital transformation: A perspective from Japan, https://thuonggiaonline.vn/chuyen-doi-so-goc-nhin-tu-nhat-ban-post92.html, updated on 05/05.

Hoang Ha (2022), Japan seriously lacks digital human resources, https://vneconomy.vn/nhat-ban-thieu-tram-trong-nguon-nhan-luc-so.htm, updated on October 5.

Phuong Ha (2023), Technology 5.0 premise for the development of society. http://baovanhoa.vn/the-gioi/artmid/425/articleid/69190/nhat-ban160-doi-mat-160voi-thach-thuc-gia-hoa-dan-so. updated Wednesday, September 20, 2023.

Thuc Linh (2023), Japan faces the challenge of aging population, http://baovanhoa.vn/the-gioi/artmid/425/articleid/69190/nhat-ban160doi-mat160voi-thach-thuc-gia-hoa-dan-so. updated Wednesday, September 20, 2023.

Phan Van Hoa (2023), How does Japan strive to promote digital transformation?, https://baonghean.vn/nhat-ban-no-luc-thuc-day-qua-trinh-chuyen-doi-so-nhu-the-nao-post265581.html, updated Tuesday, February 21.

Phan Van Hoa (2022), Why is Japan facing difficulties in the digital transformation process? https://baonghean.vn/tai-sao-nhat-ban-gap-kho-khan-trong-qua-trinh-chuyen-doi-so-post262995.html, updated Monday, December 19.

Trinh Huong (2021), Some models of digital transformation in the world and region, May 9, 2021

Ictvietnam.vn (2019), Experience in administrative reform under the premise of digitalization in Japan, https://tcnn.vn/news/detail/44134/kinh-nghiem-cai-cach-hanh-chinh-duoi-tien-de-so-hoa-tai-Nhat-Ban. html, updated on August 28.

Minh Ngoc (2022), Digitalization can create more recovery momentum for the Japanese economy, https://thitruongtaichinhtiente.vn/so-hoa-co-the-tao-them-dong-luc-phuc-hoi-cho-nen-kinh-te-nhat-ban-40929. html, updated on June 4.

Long Nguyen (2021), Japan promotes the development of 5G technology, https://vtv.vn/kinh-te/nhat-ban-day-manh-phat-trien-cong-nghe-5g-20211209083330592.htm, updated on Thursday, December 9.

Nguyen Nham (2017), Japan "robotizing" the economy, https://www.tapchicongsan.org.vn/van_hoa_xa_hoi/-/2018/48214/nhat-ban- %E2%80%9Cro-bot-hoa%E2%80-nen-kinh-te.aspx%9D, updated on November 29.

Journal of Monetary and Financial Markets, No. 15/2020, https://thitruongtaichinhtiente.vn/cach-mang-cong-nghiep-4-0-tai-nhat-ban-va-goi-y-chinh-sach-cho-viet-nam-33009.html;

TechinAsia (2016), https://genk.vn/5-thiet-bi-cong-nghe-lac-hau-van-duoc-su-dung-pho-bien-tai-nhat-ban-20160329182042269.chn. updated March 30;

World today (2023), Japan increased long-term investment in the semiconductor sector, https://vtv.vn/the-gioi/nhat-ban-tang-cuong-dau-tu-dai-han-cho-linh-vuc-chat-ban-dan-20230605223839582.htm, updated Tuesday, June 6.

Bao Thoa (2021), Determined to reform Electronic Government, Japan established a Digital Agency, https://ictvietnam.vn/quyet-tam-cai-cach-cpdt-nhat-ban-thanh-lap-digital-agency-23874.html, updated on November 8.

Pham Tuan (2022), Japan for the first time mentioned the comprehensive strategy to promote digital transformation, https://bnews.vn/nhat-ban-lan-dau-tien-de-cap-den-chien-luoc-toan-dien-thuc-day-chuyen-doi-so/271941. html, updated on December 15.

VTV.vn (2023), Japan invests 13 billion USD to promote and support for the chip industry, https://baothaibinh.com.vn/tin-tuc/218/187250/nhat-ban-dau-tu-13-ty-usd-day-manh-ho-tro-nganh-cong-nghiep-chip, updated Saturday, November 11.

IMPACT OF ENERGY CONSUMPTION AND ECONOMIC GROWTH ON CO_2 EMISSION IN SOME ASIAN COUNTRIES

Assoc.Prof.PhD. Nguyễn Thị Việt Nga* - Giang Ngọc Hà Linh**
Lê Nguyễn Hà Phương* - Tran Khanh Linh******

Abstract: ***In this study, the relationship of energy consumption, economic growth and carbon dioxide (CO_2) emission is investigated in the context of the Environmental Kuznets Curve. The research focuses on five Asian countries, namely, Indonesia, Malaysia, Myanmar, Vietnam and Cambodia, over the period of 1990-2014. A quadratic model formulation is assumed for CO_2 emission with respect to energy consumption and economic growth. Multivariate linear regression is utilized to assess whether the EKC can be confirmed or not. The aim is to investigate how CO_2 emission is affected by energy consumption, GDP, and GDP2. The results show that Indonesia, Malaysia, Myanmar and Vietnam have inverted U-shaped curves, while Cambodia follows U-shaped curves.***

• Keywords: *CO_2 emission, economic growth, energy consumption, environmental kuznets curve (EKC).*

JEL codes: E01, Q43

Date of receipt: 05th November, 2023 *Date of receipt revision: 11th January, 2024*

Date of delivery revision: 10th November, 2023 *Date of approval: 22th January, 2024*

1. Introduction

The intricate relationship between energy consumption, economic growth, and carbon dioxide (CO_2) emissions has emerged as a focal point of research and policy discourse in the context of sustainable development and environmental stewardship. As societies strive for economic prosperity, the demand for energy to fuel industrial production, transportation, and daily activities escalates, often resulting in heightened CO_2 emissions and environmental degradation. Understanding the underlying dynamics of this nexus is imperative for devising effective strategies to mitigate climate change and foster sustainable development pathways.

In this study, we embark on an empirical exploration of the impact of energy consumption and economic growth on CO_2 emissions, leveraging the analytical power of panel data analytics. By harnessing longitudinal data spanning multiple countries and time periods, panel data analysis enables us to capture both cross-sectional variations across countries and time-series dynamics within each country, offering a comprehensive understanding of the underlying relationships.

The link between energy consumption and CO_2 emissions lies at the heart of the climate change challenge. Fossil fuel combustion for energy production, industrial processes, and transportation constitutes the primary source of anthropogenic CO_2 emissions, contributing significantly to the escalating concentrations of greenhouse gases in the atmosphere. As economies evolve and transition towards cleaner and more sustainable energy sources, the dynamics of energy consumption and CO_2 emissions undergo profound transformations, necessitating a nuanced examination to inform policy interventions effectively.

Similarly, the relationship between economic growth and CO_2 emissions has profound implications for environmental sustainability. Economic development is closely intertwined with energy consumption, as industries, businesses, and households rely on energy inputs to drive production and consumption activities. While economic growth is traditionally associated with higher energy demand and increased CO_2 emissions, the nature and magnitude of this relationship vary across countries and regions, influenced by factors such as technological innovation, policy interventions, and socio-economic conditions.

** Academy of Finance; email: ngahvtc1980@gmail.com*
*** Hanoi Financial and Banking University*
**** CQ61/10.15 - Academy of Finance*
***** Bac Ninh book and school equipment joint stock company*

Panel data analytics offer a powerful toolkit for disentangling the complex interactions between energy consumption, economic growth, and CO_2 emissions. By incorporating both cross-sectional and time-series dimensions, panel data models allow for the identification of heterogeneity across countries and the exploration of dynamic relationships over time. Moreover, these models enable researchers to control for unobserved heterogeneity and endogeneity issues, enhancing the robustness of empirical findings and ensuring more accurate policy recommendations.

Against this backdrop, this paper aims to contribute to the existing literature by providing empirical insights into the impact of energy consumption and economic growth on CO_2 emissions using panel data analytics. Drawing on a rich dataset encompassing a diverse set of countries and spanning multiple years, we endeavor to elucidate the nuanced dynamics shaping the relationship between energy consumption, economic growth, and CO_2 emissions across different contexts. By doing so, we seek to inform evidence-based policy decisions aimed at promoting sustainable development and climate resilience on a global scale.

In the subsequent sections, we provide a comprehensive review of the relevant literature, delineate the theoretical framework guiding our analysis, outline the data and methodology employed, present the empirical findings, and discuss their implications for policy and future research endeavors. Through this interdisciplinary inquiry, we aim to advance our understanding of the complex interplay between energy consumption, economic growth, and CO_2 emissions, ultimately contributing to the global quest for a more sustainable and equitable future.

The rest of the paper is devided into 4 sections: Section 2 is devoted to Literature review; Research data is introduced in Section 3; Section 4 presents the empirical results and discussion.

2. Literature review

The relationship between energy consumption, economic growth, and carbon dioxide (CO_2) emissions has been a subject of extensive research in the field of environmental economics and sustainability. With the growing recognition of climate change as a pressing global challenge, understanding the intricate dynamics between these factors has become imperative for devising effective policy interventions aimed at mitigating greenhouse gas emissions while fostering economic development. In recent years, panel data analytics has emerged as a powerful tool for analyzing the complex interplay between energy consumption, economic growth, and CO_2 emissions, offering insights into both cross-sectional variations across countries and time-series dynamics within each country.

Firstly, the link between energy consumption and CO_2 emissions is well-established in the literature. Fossil fuel combustion for energy production, industrial processes, and transportation remains the largest source of anthropogenic CO_2 emissions globally (Fang et al., 2019). As economies grow and industrialize, the demand for energy inevitably increases, leading to higher levels of CO_2 emissions. Numerous empirical studies have confirmed a positive relationship between energy consumption and CO_2 emissions (Ang, 2007; Saboori et al., 2012). For instance, Ang (2007) conducted a panel data analysis covering 84 countries over the period 1971-2002 and found a statistically significant positive relationship between energy consumption and CO2 emissions.

Secondly, the nexus between economic growth and CO_2 emissions has also received considerable attention in the literature. While economic development is generally associated with increased energy consumption and CO_2 emissions, the relationship between economic growth and environmental degradation is complex and multifaceted. Some studies suggest that economic growth may lead to an initial rise in CO_2 emissions, followed by a deceleration or even a decline in emissions as countries transition to cleaner and more sustainable energy sources (Grossman & Krueger, 1995). However, empirical evidence on the Environmental Kuznets Curve (EKC) hypothesis, which posits an inverted U-shaped relationship between income and environmental degradation, remains mixed (Soytas & Sari, 2009).

As far as methodology of data analytics concern about, panel data analytics has emerged as a valuable tool for analyzing the relationships between energy consumption, economic growth, and CO_2 emissions. By incorporating both cross-sectional

and time-series dimensions, panel data models allow researchers to control for unobserved heterogeneity and endogeneity issues, thereby enhancing the robustness of empirical findings (Holtz-Eakin et al., 1988). Moreover, panel data analysis enables the exploration of dynamic relationships over time and facilitates the identification of country-specific factors influencing the relationship between energy consumption, economic growth, and CO_2 emissions (Halicioglu, 2009).

Several empirical studies have employed panel data analytics to investigate the impact of energy consumption and economic growth on CO_2 emissions. For instance, Halicioglu (2009) utilized panel data from 25 OECD countries over the period 1980-2005 to examine the relationship between energy consumption, economic growth, and CO_2 emissions. The study found a positive and statistically significant relationship between energy consumption and CO_2 emissions, as well as between economic growth and CO_2 emissions. Similarly, Fang et al. (2019) conducted a panel data analysis covering 35 countries from Asia-Pacific Economic Cooperation (APEC) over the period 1992-2015 and confirmed a positive association between energy consumption, economic growth, and CO_2 emissions.

In conclusion, the literature on the impact of energy consumption and economic growth on CO_2 emissions using panel data analytics highlights the complex and multidimensional nature of these relationships. While empirical evidence confirms a positive relationship between energy consumption, economic growth, and CO_2 emissions, the specific dynamics vary across countries and regions. Panel data analytics offers a valuable framework for disentangling these relationships and informing evidence-based policy interventions aimed at achieving environmental sustainability and economic development simultaneously.

3. Model formulation and research data

The following quadratic equation is assumed for CO2 emission.

$$Ln(CO2_{it}) = b_{0i} + b_{1i}(Ln(EC_{it})) + b_{2i}(Ln(GDP_{it})) + b_{3i}\left(Ln(GDP_{it})\right)^2 + \varepsilon_{it} \quad (1)$$

where Ln() is natural logarithm; CO_2 signifies carbon dioxide emission (metric tons per capita); EC is electric power consumption (kWh per capita); GDP is gross domestic product per capita (US$); i = 1, …, N and t = 1, …, T denote the cross sections (number of regions) and time periods, respectively; ε_{it} represents the model error with $Cov(\varepsilon_{it}, \varepsilon_{it}) =$, and for $i \neq j$: $\sigma_{ij} = 0$. The coefficients, namely, b_{0i}, b_{2i}, b_{2i}, and b_{3i}, need to be estimated.

The EKC hypothesis is investigated using the following scenarios for the relation of GDP and CO2 emission.

(a) $b_{2i} = 0$ and $b_{3i} = 0$: changes in GDP has no impact on CO2 emission

(b) $b_{2i} > 0$ and $b_{3i} = 0$: GDP growth linearly increases CO2 emissions

(c) $b_{2i} < 0$ and $b_{3i} = 0$: GDP growth linearly decreases CO2 emissions

(d) $b_{2i} \neq 0$ and $b_{3i} < 0$: inverted U-shaped relation between GDP and CO2 emissions (the EKC postulate)

(e) $b_{2i} \neq 0$ and $b_{3i} > 0$: U-shaped relation between GDP and CO2 emissions

In the interpretation of scenarios (d) and (e), the turning point (the vertex of parabola $-0.5\ b_{2i}/b_{3i}$) need to be considered.

This study focuses on five Asian countries, namely, Vietnam, Cambodia, Indonesia, Myanmar and Malaysia from year 1990-2014. The data are obtained from World Bank Development Indicators, WDI.

4. Empirical results

Table 1 displays the mean, standard deviation, minimum, and maximum values of variables based on 25 years of data.

Table 1. Descripitve Statistic of variables

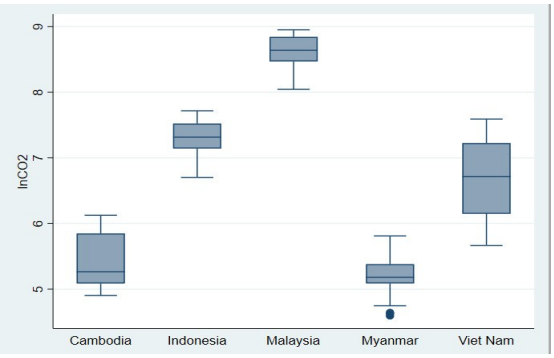
Variables	Mean	Standard deviation	Min	Max
LnCO2	6.7	1.3	4.6	9.0
LnEC	5.8	1.5	2.6	8.4
LnGDP	8.2	1.0	6.1	10.1

Source: The author

Figure. 1 shows $LnCO_2$ boxplot grouped by countries. One can do similarly to LnEPC and LnGDP.

Multivariate linear regression is applied to investigate the relationship of CO_2 emission with respect to per capita energy consumption, per capita GDP, and the square of per capita GDP for five Asian countries from year 1990-2014.

Figure 1. LnCO$_2$ boxplot grouped by countries



Source: The author

The results can be presented in the following Tables 2-6.

Table 2. Linear regression for Indonesia

	Coefficient	Standard deviation	t	P > |t|
LnEC	0.44	0.07	5.95	0.000
LnGDP	3.45	1.06	3.27	0.003
LnGDP2	-.19	.05	-3.35	0.002
cons	-10.7	4.60	-2.33	0.028

Source: The author

Table 3. Linear regression for Malaysia

	Coefficient	Standard deviation	t	P > |t|
LnEC	- 0.09	0.11	- 0.08	0.433
LnGDP	6.35	1.58	4.02	0.001
LnGDP2	-.29	0.07	-3.66	0.001
cons	-24.75	7.32	-3.38	0.003

Source: The author

Table 4. Linear regression for Myanmar

	Coefficient	Standard deviation	t	P > |t|
LnEC	1.06	.19	5.35	0.000
LnGDP	4.96	.91	5.43	0.000
LnGDP2	-.36	.06	- 5.51	0.000
cons	-16.1	3.46	-4.67	0.000

Source: The author

Table 5. Linear regression for Vietnam

	Coefficient	Standard deviation	t	P > |t|
LnEC	0.78	.12	6.42	0.000
LnGDP	1.06	.47	2.26	0.034
LnGDP2	-0.07	.02	-2.87	0.009
cons	-1.81	1.91	-0.95	0.354

Source: The author

Table 6. Linear regression for Cambodia

	Coefficient	Standard deviation	t	P > |t|
LnEC	0.29	.12	2.28	0.037
LnGDP	-5.38	1.33	-4.02	0.001
LnGDP2	.38	.09	4.14	0.001
cons	22.8	4.89	4.67	0.000

Source: The author

According to Tables from 2 to 6, we can give conclusions for each country. Let us recall that the Kuznets curve implies an inverted U-shaped curve, i.e., < 0 in Equation (1). The negative coefficient of GDP2 signifies that the economic growth helps the environmental quality. According to Tables 2-5, Indonesia, Malaysia, Myanmar and Vietnam have inverted U-shaped curves. For these countries when the GDP is less than its turning point, the economic growth causes more CO_2 emission; however, after the GDP goes beyond its turning point the environmental quality improves. Cambodia follows U-shaped curves; this implies that after GDP passes its turning point, CO_2 emission starts to increase with economic growth.

In conclusion, carbon dioxide emission is one of the important factors in climate change, which is causing natural disasters and economic losses. It is a general belief that the earth will face climatic and environmental crises in the next decade if this trend continues. The excessive energy consumption is causing high amount of CO_2 emission and exacerbating the issue. This study investigates the impact of energy consumption and economic growth on CO_2 emission in five ASIAN countries, that is, Indonesia, Malaysia, Myanmar, Vietnam and Cambodia, over the period of 1990-2014. In this study, the predictor variables are EPC, GDP, and GDP2, and the response variable is CO_2. The EKC postulates that when economic growth reaches its turning point, increases in per capita income lead to environmental improvements. Accordingly, implementation of appropriate economic and social policies is recommended for these five Asian countries to decrease CO_2 emission while improving economic growth.

References:

Ang, J. B. (2007). CO2 emissions, energy consumption, and output in France. Energy Policy, 35(10), 4772-4778.

Fang, G., Tian, L., Fu, M., & Sun, M. (2019). Energy consumption, economic growth, and carbon dioxide emissions: A panel causality analysis for APEC countries. Journal of Cleaner Production, 220, 537-549.

Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. The Quarterly Journal of Economics, 110(2), 353-377.

Halicioglu, F. (2009). An econometric study of CO2 emissions, energy consumption, income and foreign trade in Turkey. Energy Policy, 37(3), 1156-1164.

Holtz-Eakin, D., Newey, W., & Rosen, H. S. (1988). Estimating vector autoregressions with panel data. Econometrica: Journal of the Econometric Society, 56(6), 1371-1395.

Saboori, B., Sulaiman, J., & Mohd, S. (2012). Economic growth, energy consumption and CO2 emissions in OECD (Organization for Economic Co-operation and Development)'s transport sector: A fully modified bi-directional relationship approach. Energy, 40(1), 84-93.

Soytas, U., & Sari, R. (2009). Energy consumption, economic growth, and carbon emissions: Challenges faced by an EU candidate member. Ecological Economics, 68(6), 1667-1675.

OPPORTUNITIES AND CHALLENGES FOR EXPORTING GOODS WHEN VIETNAM JOINS NEW GENERATION FTAS: EXPERIENCES OF SOME COUNTRIES AND LESSONS FOR VIETNAM

PhD. Nguyen Dinh Hoan* - Nguyen Thi Lan Anh* - Le Thi Thu Hien - Nguyen Thi Hue****

Abstract: ***In January 2022, Vietnam has been participating in negotiations and signing 17 FTAs. Among them, FTAs such as CPTPP; EVFTA; AHKFTA; UKVFTA; RCEP is a new generation FTA with a broader scope, in addition to commitments on trade, services and investment, also including institutions and legal provisions in the fields of environment, labor, and intellectual property. , government procurement... When implemented, FTAs will have a strong impact on Vietnam's economic development as well as export of goods. Besides opportunities, FTAs also pose challenges for Vietnam's export of goods. The article will summarize some opportunities, challenges and some international experiences in exporting goods of these countries when they joined this agreement, thereby providing recommendations for Vietnam to be able to take advantage of the benefits brought by the FTA.***

• Keywords: *new generation FTAs, opportunities, challenges, Vietnam.*

Date of receipt: 05th November, 2023 *Date of receipt revision: 11th January, 2024*

Date of delivery revision: 10th November, 2023 *Date of approval: 22th January, 2024*

1. Overview of the FTA

Firstly, the liberalization of trade in goods: In FTAs, an indispensable content is the commitment to remove tariff and non-tariff barriers on goods. The parties commit to gradually eliminate tariffs, apply a tax rate of 0% for most goods and often specify specific lists such as: list of goods to remove tariffs immediately, list of goods to reduce tariffs. Gradual tax with tax reduction roadmap, list of sensitive goods, list of exclusions not included in the reduction... Besides providing specific tax reduction lists, FTA also provides a specific roadmap for Implement the above commitments of member countries. This roadmap is negotiated based on each country's potential, ability to liberalize and even the unique characteristics of some products. In today's FTAs, commitments not only stipulate the removal of tax barriers but also regulate quantitative restrictions and other technical trade barriers.

Secondly, an FTA often includes regulations on origin of goods. The content of this regulation is to stipulate a certain domestic content. Goods imported into the partner country must meet that domestic ratio to enjoy tax incentives compared to goods from third countries;

Thirdly, liberalization of trade in services: FTAs today often include liberalization of trade in services, meaning that countries participating in the agreement commit to opening service markets to each other, however The scope and degree of openness in FTAs depends on the participating countries.

Fourthly, investment liberalization: Commitments towards investment liberalization increasingly appear in FTAs, especially FTAs with the participation of developed countries. The content of these commitments is often regulations to remove barriers for investors of partner countries, creating favorable conditions for them to sign investments; Intellectual property provisions are also included in many "new generation FTAs". Parties generally undertake to take appropriate measures to facilitate the use of their intellectual property databases by the general public and to facilitate the patent process.

2. Opportunity and challenges

2.1. Opportunity

Tax incentives: When signing FTAs, members will enjoy tariff incentives, including reducing or eliminating tariffs according to a certain roadmap. Most countries have tariffs that apply to all remaining countries in the block. Thus, exports will grow rapidly when tax rates decrease. The tax reduction will lead to a rapid increase in imported goods among countries in the bloc due to cheaper prices, more diverse quality and designs. Tax reduction helps expand the market share of imported goods in intra-bloc countries participating in FTAs and impacts the export of goods in these countries.

Increase the localization rate: Strict rules of origin conditions in new generation FTAs will create favorable

** Academy of Finance*
*** MB Shinsei Finance Company Limited*

conditions for the direct production of raw materials to replace imports. From there, reducing the level of dependence on imported raw materials leads to an increase in the localization rate of exported goods, improving production efficiency, increasing competitiveness and creating greater added value for export.

Improved science and technology: Regulations on rules of origin, techniques, and environment for exporting goods will help promote the implementation of technical advances, technology transfer, and improve production capacity. Applying new technologies and new materials to create export products with distinct features, implementing energy-saving, high-tech, and environmental protection production programs. Participating in new generation FTAs will promote Vietnam as well as other countries to build a system of standards and techniques in the production of goods that are consistent and harmonious in terms of standards, technical regulations and international practices in order to promote technology transfer and improve technological techniques in the production of export goods.

Improve competitiveness: Improve competitiveness on three levels of industry, business, and product for countries participating in new generation FTAs. They will help improve competitiveness and vice versa, businesses in participating countries must create competitiveness to meet the regulations in FTAs. From there, exported goods will be competitive within the bloc in particular and in the international market in general.

Developing the supply chain of goods: To make good use of tariff incentives, goods from countries participating in FTAs must meet requirements on export quality standards. This will promote the construction and completion of a complete supply chain from design, raw materials, marketing, and distribution in countries participating in FTAs.

Attracting investment: FTAs have the impact of promoting the formation of investment capital flows in the production and export of goods. Because commitments in new generation FTAs ensure high benefits and fair competition, towards sustainable development and support growth, new investors and investment markets appear, so investment capital flows Investment flows faster and stronger. Since then, it has opened up many opportunities to develop goods exports of FTA member countries, but it also makes investment competition increasingly fierce.

2.2. Challenges

Requirements for technical factors and rules of origin of goods: Technical factors and rules of origin of goods are always a big challenge for Vietnam's export goods when participating in new generation FTAs. The biggest goal of countries including Vietnam is to enhance the advantages of exporting goods to member countries participating in the FTA. To achieve this goal, exported goods must fully meet very high and complex technical requirements as well as rules of origin. This requirement requires manufacturing industries to invest in development from input raw materials to the design and production stages of goods.

Meeting high technological requirements: This is both an advantage and a difficulty in developing commodity exports. Vietnam has not really developed in the industrial sector, productivity is still low, technology is not high. To ensure technical regulations, product quality standards, and environmental standards for exported goods, it is necessary to meet technological requirements in production. Thus, it is necessary to invest heavily in advanced and modern technology, machinery and equipment. This is a huge challenge for Vietnam in producing and exporting goods.

When the importing country uses safeguard measures: When an FTA member country imports goods and applies safeguard measures by increasing export tax on the exporting country when the amount of goods exported from the exporting country causing damage to manufacturing industries in importing countries. This measure serves as a form to help protect the production of countries participating in FTAs. At that time, the exporting country will suffer economic losses because it does not enjoy preferential tax rates specified in FTAs, causing difficulties for businesses exporting goods in that country.

Create competition between foreign investment (FDI) enterprises and domestic enterprises: Participating in FTAs will attract a lot of FDI capital into manufacturing fields, this is a big challenge for the manufacturing industry. domestically produced. Foreign investors have advantages in both finance, technology and market. With the benefits gained from commitments in the FTA, foreign investors will invest in domestic manufacturing industries. Foreign businesses will move factories from many countries to invested countries, causing competitive pressure with domestic businesses. At that time, domestic products will face fierce competition with products of FDI enterprises, especially competition in price and product quality.

Meet labor and environmental conditions: High labor and environmental standards are also one of the major difficulties for exporting Vietnamese goods when participating in new generation FTAs. To avoid unfair competition through not ensuring basic working conditions for workers, new generation FTAs often make separate commitments on labor. However, the conversion to meet labor standards takes a certain

amount of time, so meeting labor regulations to enjoy incentives is a challenge for commodity production industries in Vietnam. Vietnam. In addition, in FTAs, trade-related environmental issues have been included as binding obligations and are required to be enforced by member countries through the use of economic tools. international. To implement environmental provisions, Vietnam needs to adjust policies and laws related to the environment to overcome inadequacies in environmental protection when producing and exporting goods.

3. Experience in taking advantage of opportunities from FTA agreements to promote exports between the two countries.

In order to help Vietnam take advantage of opportunities and overcome difficulties and challenges when participating in new generation FTAs, below are the experiences of Korea and China in the process of participating in FTAs.

Korea: Many evaluation studies have shown the positive impacts of FTA Agreements on Korea's economy. One of the first agreements that Korea signed was the Korea-Chile trade agreement. According to the report of the Korea International Trade Association (KITA) in 2009, from the 8th country in exports to Chile, by 2013 Korea had become the 5th country, and in 2019 it ranked 8th. Korea The country has taken advantage of the market opportunities provided by the agreements and achieved export growth rates to Chile and ASEAN that are superior to the average growth rate worldwide, typically with key industries. goods such as automobiles, machinery, electronic equipment, steel and steel products, and chemicals. Since the Korea-Chile trade agreement took effect, more than 90% of Korea's exports to Chile have enjoyed preferential tax rates. It can be seen that, in order to achieve a high preferential utilization rate like the trade agreement between Korea and Chile, the content of the agreement needs to focus on key trade items between partners.

July 1, 2021 marks the 10th anniversary of the Free Trade Agreement (FTA) between Korea and the European Union (EU) taking effect. In the 10th year of the Korea-EU FTA, 98.1% of Korea's tariff barriers have been eliminated; while 99.6% of the EU's tariff barriers were eliminated in the 5th year. The Korea-EU FTA is considered one of the most comprehensive FTAs with a high level of market openness, including relevant provisions. related to intellectual property rights, trade in services and sustainable development. The current global economic situation is very complicated. Most notably, the COVID-19 pandemic has seriously affected South Korea's exports. However, despite negative developments, the Korea-EU FTA has shown many positive results over the past decade.

The FTA agreement shows that the EU is a challenging market. Currently, in addition to Korea being the first Asian country to sign an FTA with the EU, Japan, Singapore and Vietnam have also signed, so Korea will have to compete more fiercely in this market. Korea has taken advantage of tariff benefits, but its market share growth has not been much. In the first phase, Korean products must compete with high-end goods in the EU to attract consumers from 28 countries, including the UK. However, these FTAs are only in the early stages, so tax exemptions and reductions are limited. The EU is reshaping supply chains, strengthening environmental and human rights standards to reduce dependence on China. Korea should take advantage of this opportunity to expand its presence in the European market, taking full advantage of the benefits from bilateral FTAs, with tariff barriers almost completely abolished over the past 10 years.

China: Currently, China has signed 19 free trade agreements (FTAs) and is in the process of negotiating 10 other agreements involving 26 countries and territories in Asia, Latin America, and Europe. Oceania and Europe. China sees FTA as an important goal to achieve economic, political and strategic benefits in the context of globalization. Among China's partners, ASEAN is considered the most important partner, because the ASEAN-China Trade Agreement creates the largest trade area in the world in terms of population and ranks third in the world. in terms of area and population (1.9 billion people), after the EU and the North American FTA Agreement (NAFTA). Reality also shows that when participating in free trade agreements with China, goods from other countries do not easily enjoy preferential import tariffs from this country. According to statistics from the General Department of Taxation of China, the rate of taking advantage of preferential tax rates and actually enjoying preferential tax on import turnover is calculated by the proportion of import turnover that is still low. For example: For countries in ASEAN, the highest 59.79% of China's imported goods from Thailand enjoy preferential tax rates, while the preferential tax rate that Vietnam enjoys is only 39.61%, even Laos only reached 1.66%.

Another step by China in implementing trade liberalization was the establishment of the Shanghai free trade zone in 2013. This is a place to test the Chinese Government's economic reforms and opening up. economy, such as abolishing restrictions on foreign investment as well as allowing the freedom to convert the Yuan to bring the exchange rate closer to its real value. In this free trade zone, China first tested allowing interest rate liberalization. The implementation of the establishment of the Shanghai free trade zone has seen

the success of this pilot zone. After that success, China piloted six more different commercial pilot zones, but most other free trade zones only achieved mixed results, partly because of the autonomy of the nine countries.

4. Some recommendations for Vietnam

Participating in FTAs and new generation FTAs is an indispensable condition for the Vietnamese market if it wants to take advantage of the opportunities offered by the international market. From the experiences of some countries, lessons can be drawn for Vietnam as follows:

On the Government side

As a country with a developing economy, Vietnam often enjoys incentives in terms of time to implement FTA commitments. During this period, Vietnam needs to promote learning from experience from partner countries, perfecting the legal framework, institutions, and policies as well as improving the business environment and enhancing Vietnam's competitiveness. countries to be able to make good use of the opportunities that trade agreements bring; specifically:

Firstly, continue to improve trade and investment mechanisms and policies. Develop supporting industries through attracting investment, reducing input imports, increasing localization content and added value for exports. Adjust FDI investment capital flows towards selective attraction, prioritizing the development of key industries. Investment policy focuses on areas with growth and diffusion potential such as a number of industries using high technology, energy saving and environmental protection.

Secondly, develop technical standards for exported goods, promulgate regulations and standards for enterprises allowed to export certain items, creating links between exporters and manufacturers.

Thirdly, adjust the export product structure and export market structure to suit the needs of internal, regional and world markets. In addition, the adjustment of commodity and market structure must also be consistent with Vietnam's import-export strategy and other development strategies in the current period.

Fourthly, invest in infrastructure and technology. One of the important factors determining the quality of exported goods is the level of technology in production activities. Currently, most technologies in businesses need to be invested in to improve and apply scientific and technical advances in production and export. Investing in technology will create quality products that meet export product requirements and compete with other countries when participating in new generation FTAs.

Fifthly, training high quality human resources. Human resources are always an important factor determining the efficiency of production, business and export. To promote the export of goods when implementing new generation FTAs depends greatly on human factors, labor qualifications, and management. Vietnam always has a comparative advantage in labor resources with low labor costs compared to the region and the world. Although there is an abundant labor source with cheap labor costs, Vietnam still lacks a team of skilled and highly trained workers, leading to low labor productivity. To take full advantage of the advantages that FTAs bring, it is necessary to focus on developing and managing human resources, training high-quality human resources to meet the requirements set in exporting goods when participating in new generation FTAs.

Regarding businesses

Firstly, to take advantage of the advantages and limit the disadvantages brought by the challenges, businesses need to understand and apply flexibly and honestly the rules of origin; Search and develop raw material sources domestically and at FTA partners; Make the most of tariff incentives (currently the utilization rate is not high).

Secondly, businesses need to focus on investing, applying automation in production, applying new management technology, improving quality and worker skills to reduce costs and increase labor productivity. In addition, businesses need to strengthen cooperation, create and form link chains from raw material production to export to reduce costs and improve supply chain efficiency in production and business.

Thirdly, Vietnamese businesses must invest in research, product development, building brands and creating their own value. This requires time and financial resources. People also develop action programs and plans to improve production capacity to effectively exploit tariff incentives.

Thus, Vietnam is one of the countries participating in the most multilateral and bilateral free trade agreements (FTAs) in the world; including many large-scale free trade agreements, so the government as well as businesses need to proactively deploy relevant content to take advantage of and promote the effectiveness of FTAs as well as adapt to new changes that FTAs pose.

References:

Ministry of Industry and Trade, Vietnam import and export report for the years 2019 - 2023, Industry and Trade Publishing House.

International Relations Department - VCCI (2017), Russian Federation market profile, Hanoi.

Hoang Chi Cuong, Bui Thi Thanh Nhan, Do Thi Bich Ngoc (2013), New international trade theory: Test evidence from the case of Vietnam,

Do Thu Hang (2016), Promoting the export of Vietnamese agricultural products in the current context, Institute of Economic Research and Management.

Dinh The Hien (2016), AEC investment map in 2016: Where is Vietnam "located", Business Forum 2016.

Doan Thi Mai Huong (2017), Promoting Vietnam's export of agricultural products to the Russian Federation market, Finance Magazine, October 2017.

Pham Nguyen Minh (2015), Vietnam trade development and the Eurasian Economic Union in the context of implementing commitments in the Vietnam - EAEU FTA, Journal of Economics and Management, No. 42 November /2015.

Mutrap (2011), Report on assessing the impact of rules of origin in Vietnam's free trade agreements.

Nguyen Tra My (2019), Solutions to enhance advantages for exports.