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SOLUTIONS TO ENHANCE THE POSITIVE IMPACTS AND MITIGATE THE NEGATIVE SOCIAL IMPACTS OF FINTECH IN VIETNAM

PhD. Nguyen Van Thong*

Abstract: ***Fintech, with its combination of technology and finance, has quickly become an important driving force in the development of the digital economy. In Vietnam, Fintech not only promotes the growth of modern financial services but also contributes to expanding financial access for various groups, from rural residents to small and medium-sized enterprises (SMEs). The positive impacts of Fintech, such as increased convenience, improved income, and the promotion of financial inclusion, have brought numerous benefits to society. However, alongside these advantages, Fintech also poses potential negative impacts, including cybersecurity risks, imbalances in financial access, and issues related to online fraud. In this context, seeking solutions to enhance the positive impacts and mitigate the negative social effects of Fintech has become an urgent requirement. This article analyzes the social aspects influenced by Fintech, including both positive and negative impacts. It also proposes solutions to optimize the benefits that Fintech brings while minimizing the negative impacts, thus aiming for a safer and more effective Fintech ecosystem for all stakeholders in Vietnam.***

• Keywords: *positive impact, negative impact, society, fintech, Vietnam.*

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1. Introduction

In the context of the rapidly advancing Fourth Industrial Revolution, financial technology (Fintech) has become a key factor in reshaping the global financial market, and Vietnam is no exception to this trend. Fintech not only expands the scope of financial service offerings but also changes the way consumers, businesses, and even financial institutions access and use these services. In Vietnam, the explosion of electronic payment platforms, e-wallets, online lending services, and digital financial investment opportunities has brought significant opportunities to the economy. These services help bridge the financial gap between urban and rural areas, reduce traditional barriers to accessing financial services, and enhance financial inclusion. Additionally, Fintech has brought about important changes in consumer payment habits, encouraging the shift from cash payments to electronic transactions, thereby reducing social costs and improving transparency in personal and business financial management. However, alongside these clear benefits, the growth of Fintech in Vietnam also presents numerous social challenges. Issues such as financial fraud, cybercrime, privacy violations, and data security risks have become significant concerns for consumers and regulators alike. In particular, for consumers with limited financial or technological knowledge, accessing Fintech products and services could become a potential risk. Therefore, an important question arises: How can we maximize the positive impacts of Fintech while minimizing its negative effects on society? Developing and implementing effective solutions is not only the responsibility of Fintech service providers but also requires close cooperation from the government, regulators, and consumers.

2. The positive social impact of fintech in vietnam

Fintech has been and continues to bring significant social benefits in Vietnam, particularly in promoting financial inclusion and improving the financial efficiency of individuals and businesses. To highlight the positive impacts of Fintech on Vietnamese society, several aspects can be considered:

Firstly, *promoting financial inclusion*

Fintech has become a powerful tool in promoting financial inclusion in Vietnam, especially for areas and groups that are difficult to reach through traditional banking systems. Rural areas and remote regions often face challenges in accessing basic financial services due to underdeveloped banking infrastructure, sparse bank branches, and limited access to formal financial services. In this context, the development of Fintech platforms has created significant opportunities to address these issues, enabling millions of people to

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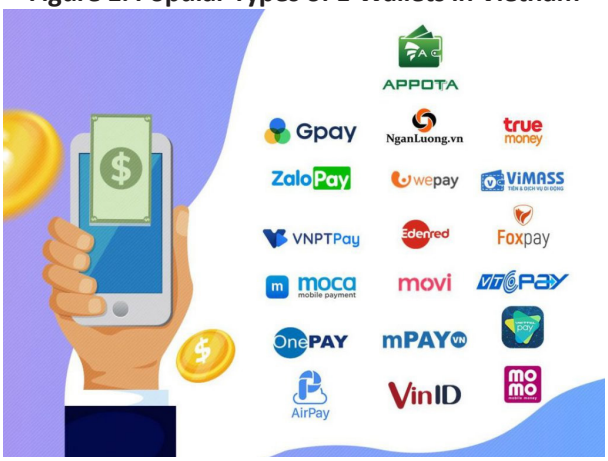
easily access financial services, thereby improving their quality of life and supporting economic development in underserved areas.

A prime example of Fintech's success in promoting financial inclusion in Vietnam is the MoMo e-wallet. Known as one of the fastest-growing digital payment platforms, MoMo had attracted over 31 million users by 2023. The platform is popular not only in urban areas but also has a widespread presence in rural areas, where people often face challenges in accessing traditional banking services. With a partner network covering a range of sectors such as supermarkets, restaurants, retail shops, and small merchants, MoMo enables people to easily carry out daily transactions without the need to visit a bank or use cash. This is especially important for small traders and businesses, who previously had limited access to formal financial services like cashless payments or effective business financial management.

Beyond payments, MoMo also provides a variety of other basic financial services, such as mobile phone top-ups, money transfers, utility bill payments, and even insurance and small consumer loans. This makes it easier for people in remote areas to access financial services quickly and conveniently. With just a smartphone, individuals can actively manage their finances, saving time and costs compared to traditional methods. Not only MoMo, but many other Fintech platforms in Vietnam, such as ZaloPay, ViettelPay, and VNPay, are also making positive contributions to expanding financial services to people across the country. These platforms offer simple, user-friendly financial solutions that do not require users to have traditional bank accounts. This is a major step forward in reducing dependence on the banking system and providing more options for people to manage their personal finances. This not only improves people's quality of life but also boosts economic growth. When people have access to financial services, they can easily manage spending, save, invest, and grow their businesses.

Fintech has also played a significant role in enhancing transparency and security in financial transactions. In rural or remote areas, where financial management still relies heavily on cash, people often face safety risks when holding money or making transactions. Fintech platforms like MoMo and ZaloPay have helped minimize these risks by digitizing transactions, allowing users to store and carry out financial transactions in a safer, more secure, and transparent manner. This not only benefits consumers but also creates a more trustworthy financial environment for the economy. Thus, the development of Fintech in Vietnam, through platforms like MoMo, has been creating a financial revolution, enabling millions of people to access financial services more conveniently and efficiently. Fintech not only helps narrow the financial gap between regions but also plays a crucial role in building an inclusive economy, where all people, regardless of economic or geographic conditions, can easily and equally participate in the financial system.

Figure 1. Popular Types of E-Wallets in Vietnam



Secondly, *enhancing transparency and security in financial transactions*

Transparency and security in transactions are among the major benefits Fintech brings. For example, the online money transfer platforms of banks and e-wallets in Vietnam allow users to track all of their transactions, including the date, time, amount, and recipient. This helps minimize fraudulent activities and asset losses during transactions, while also enabling users to manage their finances more effectively. For instance, the MoMo e-wallet app provides users with detailed transaction history and monthly spending reports, helping them better control their personal finances. Many Fintech users in Vietnam report feeling more secure when using digital payment services due to the transparency and security they offer. At the same time, the development of biometric security systems, such as facial recognition and fingerprint scanning, has significantly improved the safety of online transactions, reducing the risk of fraud and information theft.

Thirdly, *promoting digital transformation and changing consumer habits*

The COVID-19 pandemic has significantly increased the use of digital financial services in

Vietnam. The pandemic led to a surge in demand for online shopping and payments, thus driving the growth of cashless payment solutions. Services such as QR code payments, mobile money transfers, and online bill payments have become everyday habits for many Vietnamese consumers. In the first six months of 2024, cashless payment transactions reached 7.83 billion, with a total value of 134.9 trillion VND (a 58.23% increase in number and a 35.01% increase in value) compared to the same period in 2023. This included: a 49.97% increase in the number and a 32.13% increase in value of transactions through the internet; a 59.3% increase in the number and a 38.53% increase in value of mobile phone transactions; and a 104.2% increase in the number and a 99.5% increase in value of QR code transactions. The total number of registered and used Mobile-Money accounts was approximately 9.13 million, with about 72% of users from rural, mountainous, remote, border, and island areas (Doan Hang, 2024).

Fourthly, *creating job opportunities and promoting entrepreneurship in the fintech sector*

The rapid development of Fintech companies in Vietnam has significantly contributed to job creation, especially in fields such as information technology, data management, cybersecurity, and financial analytics. As Fintech startups continue to flourish, they not only create direct employment but also generate a multitude of indirect opportunities in areas like marketing, customer service, and business development. For instance, companies like Tima, Finhay, and Trusting Social have directly employed thousands of young professionals and also supported a wide range of service providers, from developers to marketing consultants. Finhay, a micro-investment platform, has gained traction with hundreds of thousands of users and attracted substantial foreign investment, further stimulating the creation of new jobs and the development of a skilled workforce in the financial technology sector. This rapid growth of the Fintech ecosystem has fostered a vibrant entrepreneurial culture, offering opportunities for both seasoned professionals and young entrepreneurs. The sector has encouraged innovation in the development of financial products tailored to local market needs, ranging from micro-investment solutions to accessible credit offerings. In addition, the rise of Fintech startups has also created a ripple effect in other sectors, such as education, where training programs and boot camps focused on Fintech and financial technology skills are becoming increasingly popular. Furthermore, the success of Fintech startups in Vietnam has established the country as a growing hub for Fintech entrepreneurship in Southeast Asia. This development has allowed local entrepreneurs to compete on a global scale, contributing to the country's economic transformation and technological advancement.

Fifthly, *supporting small and medium enterprises (smes) in accessing capital*

Another key benefit of Fintech is its ability to offer financial solutions that cater to the needs of small and medium-sized enterprises (SMEs), a crucial sector of Vietnam's economy. While SMEs are essential for job creation and economic growth, they often face significant barriers when it comes to accessing traditional forms of financing, such as bank loans. The lack of credit history, the complexity of loan approval processes, and the stringent collateral requirements make it difficult for many SMEs to secure the funds they need to grow. Fintech platforms, particularly peer-to-peer (P2P) lending services like Tima and Vaymuon, have emerged as game-changers in this regard. By using technology to match lenders directly with borrowers, these platforms have made it much easier for SMEs to access capital quickly and with fewer bureaucratic hurdles. Businesses can apply for loans online, often without the need for physical documentation or lengthy approval processes that typically come with traditional banking systems. Moreover, these Fintech platforms utilize innovative credit scoring models based on alternative data sources, such as transaction history, social media activity, and even mobile phone usage. This allows them to assess the creditworthiness of SMEs that may not have a traditional credit history, helping to bridge the financing gap. By offering faster, more accessible loan approval processes, Fintech platforms have opened up new avenues for business growth, particularly for startups and small businesses that might otherwise be excluded from traditional lending systems. The impact of Fintech on SMEs goes beyond just access to capital. The introduction of digital payment solutions, financial management tools, and even platforms for invoice factoring or trade financing has empowered SMEs to manage their cash flows more effectively, automate their processes, and make more informed financial decisions. This has not only improved the overall operational efficiency of SMEs but also strengthened their position in the market by enabling them to scale up, innovate, and compete more effectively.

As Fintech continues to grow, it is expected to provide even more tailored financial services to SMEs, further promoting entrepreneurship, and driving economic growth in Vietnam. By offering affordable, efficient, and scalable solutions, Fintech is contributing to the development of a thriving SME ecosystem that will help power Vietnam's economic future.

3. Some negative social impacts of fintech

While Fintech has brought significant benefits to society, it has also introduced certain negative effects that need to be addressed. The rapid expansion of financial technology in Vietnam, though largely positive, has created new challenges in various areas, such as data privacy, financial security, and consumer protection. These negative impacts can undermine the trust and reliability that are essential for the sustainable growth of the Fintech sector. Below are some of the key negative social impacts of Fintech:

Firstly, *data privacy and security concerns*

One of the most significant concerns regarding Fintech is the security of personal data. As financial services become increasingly digitized, the amount of sensitive information being shared and stored online has grown exponentially. This includes personal financial data, identification information, and transaction history, which are vulnerable to cyberattacks and data breaches. In Vietnam, the use of mobile wallets, online payment systems, and P2P lending platforms has increased, but these platforms are often targeted by hackers looking to steal customer data. This presents a serious risk to the privacy and safety of users, especially in a country where many individuals may not fully understand the potential risks involved in sharing their financial information online. Furthermore, the proliferation of data has led to concerns over how personal information is being used by Fintech companies. Many companies collect large amounts of user data for targeted marketing, profiling, and even credit scoring, often without sufficient transparency or user consent. The lack of clear data protection regulations and consumer rights has made it difficult for individuals to fully control how their personal information is handled, leading to concerns about potential misuse or exploitation.

Secondly, *increased risk of financial fraud and scams*

The rise of Fintech has also opened the door to new forms of financial fraud and scams. While Fintech platforms provide numerous benefits in terms of convenience and accessibility, they have also created new opportunities for fraudulent schemes. For example, phishing attacks, where scammers impersonate legitimate Fintech companies to steal personal information, have become more prevalent. Additionally, fraudulent investment schemes, fake loan offers, and Ponzi schemes are being promoted via social media, targeting unsuspecting individuals, especially those who are not well-versed in financial technology. In Vietnam, where financial literacy is still developing, many individuals, particularly in rural areas, may be more vulnerable to these scams. The ease of accessing financial services online means that users are often not fully aware of the risks involved, and in some cases, may fall victim to fraudulent platforms that appear legitimate. This not only causes financial losses for consumers but also undermines trust in the Fintech ecosystem as a whole.

Thirdly, *exclusion of certain social groups*

Although Fintech has greatly expanded access to financial services, it has also, in some cases, excluded certain social groups from fully benefiting from these advancements. A major issue is the digital divide: individuals who lack access to smartphones, the internet, or even basic digital literacy skills are at a disadvantage when it comes to using Fintech services. In rural and remote areas of Vietnam, where internet connectivity is limited, many people remain excluded from digital financial services. Additionally, individuals who are not familiar with technology—such as the elderly or those with low levels of education—are often unable to take full advantage of Fintech platforms. This technological gap can create a form of financial exclusion, where certain populations are unable to access the benefits of financial innovation, such as easier payments, digital loans, or investment opportunities. This problem may exacerbate existing inequalities, leaving vulnerable groups at a greater disadvantage and widening the gap between the digitally connected and the disconnected.

Fourthly, *over-indebtedness and financial instability*

Another concern with the rapid growth of Fintech is the potential for over-indebtedness. The rise of digital lending platforms and micro-loans, often with quick approval processes and high-interest rates, has made it easier for individuals to access credit. While this can be beneficial for those who need short-term financial assistance, it can also lead to irresponsible borrowing and a cycle of debt. Many borrowers,

especially those with limited financial knowledge, may take out loans without fully understanding the repayment terms, interest rates, or the long-term consequences of borrowing. This can lead to a situation where people become over-indebted and unable to repay their loans, thus falling into financial instability. As digital lending platforms are often less regulated than traditional financial institutions, the risk of predatory lending practices is also high, further exacerbating the problem.

Fifthly, *job displacement and the impact on traditional financial services*

While Fintech has created many new job opportunities, it has also led to job displacement, particularly in traditional financial services. As Fintech platforms automate many financial processes, such as payments, loans, and investment management, the need for traditional banking staff, insurance agents, and other financial intermediaries has declined. This has affected many employees who were previously employed in traditional banks, insurance companies, and lending institutions. For workers in these sectors, the transition to the digital economy may be difficult, especially if they lack the necessary skills to work in the Fintech industry. This can lead to unemployment or underemployment, particularly among older workers or those without access to retraining opportunities. The shift toward digital financial services could, therefore, contribute to rising inequality and create economic challenges for those unable to adapt to the changing job market.

4. Some solutions to enhance the positive impacts and minimize the negative social impacts of fintech in Vietnam

To maximize the positive impacts and minimize the negative effects of Fintech on society in Vietnam, a comprehensive set of solutions must be implemented at the levels of government regulation, businesses, and consumers. Below are some specific solutions:

Firstly, improving the legal framework and strengthening fintech regulation

To ensure the sustainable and safe development of Fintech in Vietnam, the improvement of the legal framework is a prerequisite. Currently, while Fintech is growing rapidly, many areas still lack clear legal regulations, which poses risks not only for businesses but also for consumers. Regulatory bodies such as the State Bank of Vietnam, the Ministry of Finance, and the Ministry of Public Security need to coordinate to issue and update legal regulations related to Fintech, especially in areas like data protection and transaction safety. These regulations should ensure that all Fintech services operate transparently, protect user rights, and create a healthy competitive environment among businesses. Additionally, strict supervision of Fintech companies must be implemented to ensure that only licensed firms, meeting financial and security standards, are allowed to operate. This will help reduce legal risks and prevent the misuse of financial technologies for illicit activities. At the same time, establishing regular dialogue mechanisms between the government and Fintech companies is crucial. Through such dialogues, the government can listen to the challenges and difficulties faced by Fintech businesses during their development. This will help adjust policies in a flexible and timely manner to keep up with the rapid pace of technological change, ensuring that regulations protect consumers while not hindering innovation and business creativity.

Secondly, promoting digital financial literacy and raising consumer awareness

One of the key factors to fully harness the benefits of Fintech is enhancing awareness and technological skills for consumers. Currently, not everyone has the necessary knowledge to use digital financial services safely and effectively, especially older individuals or those living in remote areas. Implementing digital financial education programs is essential so that people can access and use Fintech services responsibly. National awareness campaigns about Fintech should be intensified, helping consumers understand digital financial products, identify potential risks, and learn how to protect their personal information when transacting online. Moreover, digital financial education should be integrated into the educational system from secondary schools to universities. This will allow young people to be introduced to and familiarize themselves with digital financial services early, thereby improving their financial and technological skills. In particular, programs focused on digital financial literacy should emphasize skills to protect oneself from online fraud and use Fintech services securely. When consumers have the necessary knowledge and skills, they will not only avoid risks but also be able to maximize the benefits offered by Fintech.

Thirdly, enhancing the application of security and cybersecurity technologies

Information security and cybersecurity are top concerns when discussing the development of

Fintech. Fintech companies in Vietnam need to invest heavily in security technologies to protect customers' personal information and financial data from cyberattacks. This will not only build consumer trust in Fintech services but also help prevent financial fraud and cybercrimes. Modern security technologies, such as data encryption, two-factor authentication, and artificial intelligence in detecting suspicious transactions, should be widely implemented. Additionally, there should be close cooperation between Fintech companies, financial institutions, and government agencies to share information about cybersecurity threats and coordinate responses to cyberattacks. Regulatory authorities must also increase monitoring and periodic security audits of Fintech platforms to ensure that companies comply with information safety standards. At the same time, establishing consumer support centers to assist and protect users facing security or cybersecurity issues is essential, helping to reassure people when using Fintech services.

Fourthly, developing a comprehensive and integrated digital infrastructure

Developing digital infrastructure is a core factor for Fintech to reach all segments of society, especially in rural and underserved areas. Currently, some regions in Vietnam still lack full access to the internet and digital services, which creates inequality in benefiting from Fintech. The government needs to continue investing in the development of internet infrastructure, ensuring that people in remote areas can also access digital financial services conveniently. Telecommunication services should be upgraded to meet the demand for high-speed and stable internet access, supporting seamless transactions and the use of Fintech applications. At the same time, it is essential to implement technical support programs for citizens to help them access and use digital technologies. In particular, training and support programs for low-income individuals or those who are not familiar with using technological devices should be provided. This will help reduce the digital skill gap between different groups of people and ensure that everyone has the opportunity to access and benefit from Fintech's development.

Fifthly, promoting collaboration between fintech and traditional banks

To alleviate pressure on traditional banks and create a harmonious financial ecosystem, it is essential to promote collaboration between Fintech companies and banks. Rather than engaging in fierce competition, both parties can collaborate to create innovative financial products and services that benefit both businesses and consumers. Traditional banks can leverage advanced technologies from Fintech to improve their services, while Fintech companies can use the extensive customer networks of banks to expand their market share. This collaboration will not only help reduce competitive pressure but also generate many innovative financial products that meet the diverse needs of customers. The government should also encourage these collaborative models through preferential policies or tax incentives, contributing to the development of a comprehensive and sustainable financial ecosystem in Vietnam.

Conclusion: The development of Fintech in Vietnam has brought many positive social benefits, enhancing access to financial services, promoting the digital economy, and improving the efficiency of both businesses and individuals. However, alongside these positive impacts, Fintech also presents several challenges, including risks to information security, financial fraud, and the widening inequality in technology access. To fully harness the benefits of Fintech while minimizing its negative effects, strong collaboration between all stakeholders, including the government, businesses, and consumers, is required. Improving the legal framework, enhancing financial literacy, investing in digital infrastructure and security technologies, and promoting collaboration between Fintech companies and traditional banks are crucial solutions for guiding the sustainable and socially beneficial development of Fintech. Only through the coordinated implementation of these measures can Vietnam fully unlock the potential of Fintech, making it a vital tool for economic growth and improving the quality of life for its citizens.

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IMPACT OF FOREIGN INVESTORS ON THE VIETNAMESE STOCK MARKET IN NEW CONTEXT

PhD. Hoang Anh Tuan* - PhD. Le Trang Nhung*

Abstract: ***The empirical research aims to examine the relationships between the net purchase of foreign investors and the performance of the Vietnamese stock market and the market liquidity. Based on data listed in the Ho Chi Minh Stock Exchange for the period 2020-2022, the main findings of this study are: first, the transaction of foreign investors has a positive impact on the market; second, market liquidity is not affected by the net purchase of foreign investors. Research results are significant for the domestic investors to have more effective trading decisions; for the market management agencies to promulgate regulations to make the stock market more balanced and transparent in a new context, Vietnam is moving towards sustainable economic development.***

• Keywords: *foreign investor, market liquidity, vn-index.*

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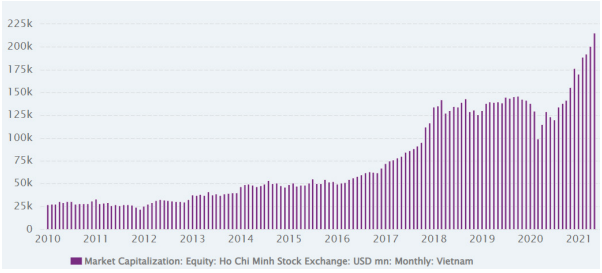
1. Introduction

The stock market serves various essential functions for the economy. It allows enterprises to raise capital through various means, such as IPOs, issuing additional shares or bonds. Furthermore, it provides individuals or funds with an attractive investment opportunity beyond traditional options such as saving money in a bank or investing in real estate. In this way, the stock market plays a crucial role in stimulating economic growth and promoting investment diversification. The health and the quality of the economy can be reflected clearly through the stock market if there are any fluctuations in the country or over the world. Moreover, the stock market is a place where the government enacts and applies policies.

Vietnam stock market is 25 years old. On July 11 1998, Vietnam Securities Market was officially born with the establishment of Ho Chi Minh City Securities Trading Center (HOSTC) but two years later, on July 28 2000, the first trading was made with two issued companies. On May 11, 2007, the Prime Minister signed Decision No. 599/QD to transfer HOSTC to the Ho Chi Minh City Stock Exchange (HOSE), operating under the model of one limited member company (100% owned by the Ministry of Finance). The transformation of the model has helped HOSE take a position compatible with other exchanges in the world in terms of relationship and international cooperation, thereby raising the position and influence of the stock market in Vietnam. This study focuses to the VN-index, which presents for all stocks in HOSE.

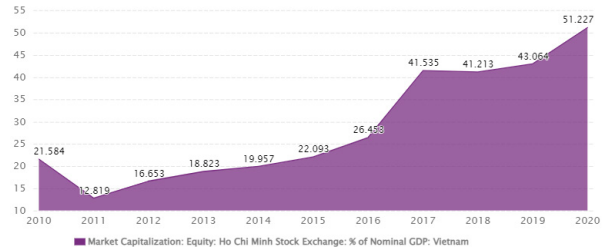
After the economic crisis in 2010-2011, the market capitalization in Vietnam grew steadily. Especially from 2018 to 2021, it increased dramatically and was more than two and a half than before (figure 1).

Figure 1: Market capitalization of Vietnam



Source: https://www.ceicdata.com

Figure 2: Stock market capitalization over GDP



Source: https://www.ceicdata.com

In figure 3, the ratio of market capitalization over the GDP of Vietnam was about 12.8% in 2011, but in 2020, it took more than half of the GDP (51.227%). In 2020, this ratio in Thailand was 108.24%; in Philippines was 75.46%; in Singapore is 191.95%. Compared to other countries in Asian, the capitalization of Vietnam's stock market is significantly smaller, but it had steady growth through the years.

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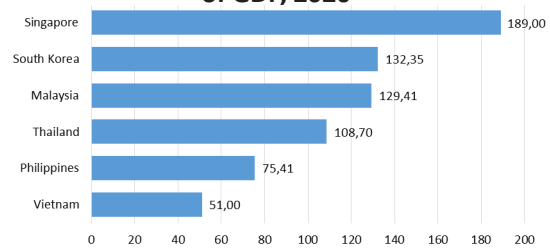
Figure 3: Stock market capitalization as percent of GDP, 2020



Source: https://www.ceicdata.com

Financial liberalization is important to economic growth, especially for emerging countries like Vietnam. However, the impact of this phenomenon is significantly different across countries and surveyed periods. Nguyen Minh Tri (2017) gives strong evidence to prove that net purchasing of foreign investors has a positive relationship with market performance but a negative one with liquidity of the Vietnamese stock market in 2011-2015. Le Trang Nhung & Le Hai Dang (2019) chose the next period (2016-2018) - the markup or bull market period to examine the impact of foreign investors' net purchases on the Vietnamese stock market. In this period, the market makers had gathered enough stock, which was the time to push the price and sell their stock. This paper used the similar source of data, a similar model, but the period was chosen from 2020 to 2022 to re-examine the impact of net trading of foreign investors on the stock market. The aims of this scientific study are threefold. Firstly, the study seeks to use the Wyckoff theory to explain the variations in the results across the different study periods. Secondly, the research will evaluate the influence of foreign investors' net trading volume on the Vietnamese stock market's price index (VN-Index) and its liquidity over the 2020-2022 period. Finally, the study aims to offer recommendations that can enable individual investors to make informed trading decisions based on the empirical findings. By accomplishing these objectives, the research aims to contribute to a better understanding of the impact of foreign investors on the Vietnamese stock market and provide useful insights for policymakers and investors.

The structure of this research is as follows. Section 1 is the introduction. Section 2 reviews empirical research related to this study. Section 3 contains the theories related to the idea of this topic. Data, variables and methodology will be presented in section 4, while section 5 shows the results and explanations.

2. Literature review

In recent years, the capital flow has tended to invest in emerging markets or inferior markets with many potential developments. These countries are in the transformation phase, so foreign investments are very important for their growth, while local capital still doesn't adapt to the development. Much literature research provided evidence for an opening market's benefits and potential risks.

Arcabic et al. (2012) tested the correlation between FDI and the stock market in Croatia in both the short and long term. The FDI in the long run, through the channel of economic growth, can specify the trend of the stock market but in the bull market in short run, the stock market trend can positively impact FDI stocks. On the contrary, NJane (2017) concluded that FDI inflows don't significantly affect the development of Kenya's stock market. FDI flows and other factors like economic growth, inflation rate, interest rates, and exchange rates are required to develop Kenya's stock market. Shahbaz et al. (2013) also supported the role of foreign direct investment to Pakistan stock market besides other macroeconomic factors like income, inflation, and domestic saving.

Wang (2000) proved that foreign transaction has a significant effect on market volatility, but it also increases the local market depth and liquidity in the Indonesian market. Even though foreign buyers are more numerous than sellers, the market still suffers from the impact of these foreign sellers. In other words, the market is very sensitive when foreigners sell to local investors, not among them. Avci (2015) agreed with the important role of foreigners trading in emerging stock markets and explained the relationship between the percentages of foreign investors' participation and the market volatility.

Haider et al. (2017) confirmed that in China, foreign portfolio investment has a significant positive effect on stock market return but has a negative relation with the consumer price index. Linh Nguyen and Nhung Le (2013) demonstrated that past foreign portfolio flows strongly impact Vietnamese stock market volatility daily, while they found a few pieces of evidence weekly. Besides, they realized that past foreign flows have more significant impacts in the bull market than in the bear market because the local investors are now more prudent and react to changes prudentially.

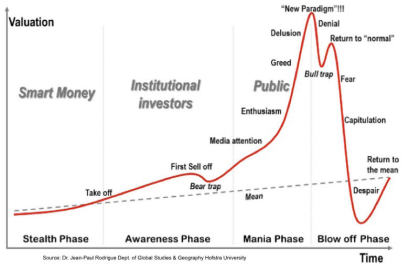
Tri Minh Nguyen (2017) uses ARCH model to examine the impact of the net purchase of foreign investors on the stock market and market liquidity. His results explained the behaviors of foreign investors in the accumulation phase, where they - one of the market makers- try to gather stocks at low

prices. In this period, buying stocks (net purchasing of foreign investors increases) will increase the stock price (positive relationship), but the market makers don't want to purchase high-priced stock. Therefore, they buy the stock when its price goes down. At this moment, the market's liquidity is low because no one wants to sell at low price and this is the time for market makers to buy stocks (negative relationship). Le Trang Nhung & Le Hai Dang (2019) chose the next period - the markup or bull market period to examine the impact of the net purchase of foreign investors on the Vietnamese stock market. In this period, the market makers had gathered enough stock, which was the time to push the price and sell their stock. Therefore, the increase in net purchasing of foreign investors will decrease the market index but increase the total volume trading of the market.

3. Theory

Richard Demille Wyckoff (November 2, 1873 - March 19th, 1934) was one of five legends of technical analysis: Charles Henry Dow, Ralph Nelson Elliott, William Delbert Gann and Arthur A. Merrill. Many of Wyckoff's theories became basic premises for technical analysis, such as theories about accumulation, distribution, and analysis of price and volume to determine the trends of stocks. Wyckoff was a professional trader, an educator, and a publisher. He was a stock market authority, founder, and one-time editor of the Wall Street Magazine and the Stock Market Technique. Wyckoff's research discovered the main characteristics of the winning stocks and the market makers of the time. He analyzed their traces and determined the ratios between risk and profit for trading.

Figure 4: Stock cycle according to Wyckoff

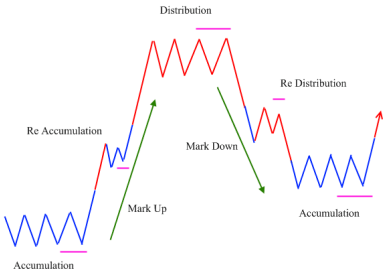


Source: Dr. Jean-Paul Rodrigue Dept.

His theories proposed that the market is inefficient and no random walk exists. One stage of strong fluctuation (up or down) results from one or more groups of market makers who hold lots of stock or have much money controlling the market. To do these things, they need some advantageous conditions from macroeconomic factors, policy changes, or positive news from the media. They are confident that the crowd or individual investors are dumb, always ready to buy at a high price or sell at a low cost.

According to Wyckoff's theory, all stocks undergo a cyclical pattern consisting of four distinct phases: the stealth phase, awareness phase, mania phase, and blow-off phase (refer to Figure 4). When the stock price is low or under its real value, the smart money or the investors who follow the value analysis school will start to buy. Then, the institutional investors or funds will buy these stocks when they realize their potential value. After the market makers have cumulated enough stocks and the company has some achievements along with good conditions, the media and the public will pay attention. To pull the price to a new high in the mania phase, the market makers will create more good news and optimistic plans, attracting many individual investors. This phase is also a phase for market makers distributing stocks. When the price has reached the ridiculous top, the stock will turn into blow off phase where many lousy news and disadvantageous conditions appear. In this case, the market makers had sold most of their stocks before and will now try to push the price very fast. Individual investors, in panic, will try to sell stocks as fast as possible until the price is too low. And another cycle begins with the cumulating phase by the market makers.

Figure 5: Stock's phase according to Wyckoff



Source: Medium.com

To be simple, there are 4 phases for a stock: accumulation, markup, distribution, and markdown (Figure 5). Each phase has a different length of time depending on stock's characteristics or economic conditions.

4. Research model

There are stock exchanges in Vietnam: Ho Chi Minh Stock Exchange (HOSE), Ha Noi Stock Exchange (HNX), UPCom, and the government bond market. However, the HOSE is much larger. As of August 2022, HOSE listed 385 stocks with a market capitalization of 23 trillion dong (accounting for 62% of the market capitalization rate). The database collected from HOSE, available on websites hose.com.vn, cafef.vn and vietstock.vn. The selected period

is from 1th April 2020 to 30st April 2022 (501 trading days), and it considers the performance of INDEX, the liquidity of the market as well as the purchase of foreign investors.

In previous research, Pool Ordinary Least Square Regression with time series data was used to determine the relationship between the trading of the market and the trading of foreigners and their liquidities. We have two simple models:

Model 1: $VNI_t = a_0 + a_1 \times F\_VOL_t + e_t$.

Model 2: $V\_VOL_t = a_0 + a_1 \times F\_VOL_t + e_t$.

The first dependent variable is the VN-Index, which represents all the stocks available and the volatility of prices at the HOSE. The calculating formula is applied to all listed shares at the HOSE to reflect the trend of daily stock prices.

$$\text{VNIndex} = \frac{100 * \sum_{i=1}^{N} P1i * Q1i}{\sum_{i=1}^{N} P0i * Q0i}$$

Which is:

P1i: Current price of stock i

Q1i: Volume in circulation (volume of shares) of shares i

P0i: Price of stock i original period

Q0i: Volume of stock i at the base period

The second dependent variable is the liquidity of the market (Code: V_VOL), represented by the stock's total exchanged volume in one day. This study shows that the exchange of foreigners is one of the important impacts on the stock market's liquidity.

To estimate the trading of the market and the foreigners, net purchase is considered in volume, which means the total exchange of stock done by the foreign investors.

Table 1: Variables and their codes

Variables	Code
Stock market performance (End of Day)	VNI
Total trading volume of VN-Index	V_VOL
Net purchasing volume of Foreign	F_VOL
Percentage of volume of foreign over total volume of the market	F_V_VOL

This research collects Stock market performance data (end of day); Total trading volume of VN-Index data; Net purchasing volume of Foreign data; Percentage of volume of foreign over total volume of the market data in the period of 2020-2022. Table 2 shows the descriptions of the trading of the market and foreigners during the target period (2020-2022).

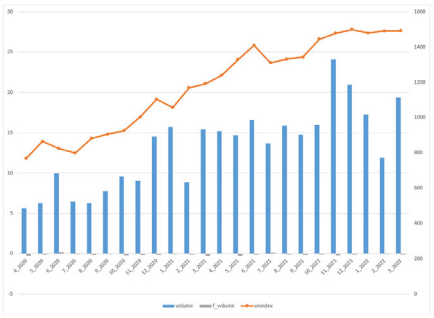
Table 2: Data description

Variable	Observations	Mean	Std. Deviation	Minimum	Maximum
VNI	501	1170.9	246.1	680.2	1528.6
V_VOL	501	630 mils	247 mils	189 mils	1522 mils
F_VOL	501	4.8 mils	16 mils	- 61.1 mils	191 mils
F_V_VOL	501	-1.69 %	4.5 %	- 17.78 %	26.76 %

Source: Results from STATA

As we can see, the VN-Index is spread in large wide range from 680.2 to 1528.6, leading to a high standard deviation. In addition, the proportion of foreigners in the whole market is small on average, but the standard deviation, minimum, and maximum are significant. This proves that foreign investments can affect the Vietnam stock market through shocks or special events.

Figure 6: Total volume trading of Foreigners and the market



Source: hose.com.vn

Figure 6 presents the total volume of foreigners and the total volume of VN-Index. It seems they have a positive relationship, especially at the end of the period.

Regression Analyses and Results

The research uses Pool Ordinary Least Square Regression with time series data to determine the relationship between the trading of the market and the trading of foreigners and their liquidities. Then, heteroskedasticity and autocorrelation is used for each model. We can see in Table 3 that there is no heteroskedasticity in model 1, but model 2 contains the heteroskedastic problem. For both models, there is autocorrelation.

Table 3: Breusch - Pagan test

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
	Model 1	*Model 2*
Chi - square	0.16	4.47
Prob.> Chi-square	0.6896	0.0350
Breusch-Godfrey LM test for autocorrelation		
	Model 1	*Model 2*
Chi - square	389.949	292.447
Prob.> Chi-square	0.0000	0.0000

Source: Results from STATA

VN-Index is non-stationary, so the first difference between VN-Index and d is present.VNI is used. Table 4 shows the Dickey fuller unit root test that the null hypothesis of unit root is rejected, and all variables become stationary.

Table 4: Dickey Fuller test

	Test statistic	1% critical value	5% critical value	10% critical value
d.VNI	-19.673	-3.457	-2.878	-2.570
V_VOL	-5.507	-3.448	-2.287	2.570
F_VOL	-20.279	-3.448	-2.874	-2.570
MacKinnon approximate p-value for Z(t) = 0.0000				

Source: Results from STATA

Lagged variables can affect its dependent variables in time series data, so the Vector Autoregressive model is run to determine the maximum lag order. The maximum lag orders are second for both d.VNI and V_VOL, and to solve the heteroskedasticity and autocorrelation problems, the ARCH model is used as follows:

Model 3: $V\_VOL_t = a_0 + a_1 \times F\_VOL + a_2 \times V\_VOL_{t-1} + a_3 \times V\_VOL_{t-2} + e_t$.

Model 4: $d.VNI_t = a_0 + a_1 \times F\_VOL + a_2 \times d.VNI_{t-1} + a_3 \times d.VNI_{t-2} + e_t$.

Table 5: ARCH models

Results by using ARCH regression	
Model 3	
F_VOL	*1.13e-07 **
$d.VNI_{t-1}$	*0.394 **
$d.VNI_{t-2}$	*0.061*
Model 4	
F_VOL	*-0.326*
V_VOL_{t-1}	*0.614 **
V_VOL_{t-2}	*0.038*

Source: Results from STATA

** denote significant level at 1%*

As we can see from the results of model 3, each unit of the total volume of foreigners increases, making VN-Index increase by 1.13e-07. This is strong evidence of a positive relationship between the net purchase of foreigners and the VN-index, which is similar with Richard (2005) and Nguyen Minh Tri (2017). These results are suitable in the distribution market period of Wyckoff's theory. Foreign investors are classified as one of the market-maker groups. In the distribution phase, market-maker investors with high returns begin distributing their assets to retail investors to make more profits. Almost studied days, the net volume of foreign investors is negative. The net selling behavior of foreign investors reduces the stock price, leading to a decrease in the VN-Index. Another interesting finding of this paper is that the market performance of day t is positively associated with the market performance of day t-1. As an appropriate explanation, in the Vietnamese stock market, the government regulates the waiting time for receiving stocks after buying them as t+3.

Model 4 results show that foreign investors' variable net trading volume is not statistically significant. On August 10, 2017, Vietnam's derivatives market started official operations with the VN30-Index futures contract set to launch first. In Vietnam, the current law allows three types of derivative products - futures contracts of shares indexes with the VN30-Index and HNX30-Index as underlying assets and five-year Government bond future contracts. The derivatives market also impacts the liquidity of the market. Therefore, the model of the effect of foreign investors' net trading volume on market liquidity is no longer meaningful. Future studies will examine the impact of derivatives trading on the market's liquidity.

Conclusion

This research supports the positive relationship between market performance and net purchasing of foreigners in the distribution period. In addition, lag factors can affect to market performance because of some features and regulations of Vietnam. According to the theory, market makers, typically large financial institutions, can influence the market by buying or selling large amounts of securities. In the distribution phase, market makers may sell their stocks in large volumes, which could decrease the index. This could occur if the market is oversupplied with securities and the market makers are looking to liquidate their positions. In such a scenario, the increased selling pressure could push down the prices of the securities, causing the index to fall.

The results of this study are empirical evidence that can be useful for both state management agencies and individual investors in Vietnam. The results of this study can help state management agencies better understand foreign investors' impact on the economy and stock market and potentially make regulatory changes to ensure a more balanced and transparent market. This research can also help individual investors make more informed trading decisions based on the study's findings.

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IMPACT OF CLIMATE CHANGE ON ECONOMIC GROWTH: CASE STUDY IN VIETNAM

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Abstract: ***This arrticle researchs impact of climatic change on economic growth in Vietnam from 1995 to 2023 by applying quantitative research design and secondary data. The data was collected from World Bank, Tradingeconomics, General Statistics Office of Vietnam, ourworldindata.org. SPSS was used for data analysis and statistical methods such as Multiple Regression Analysis and Pearson Correlation was tested to examine the influence of climate variables on economic growth in Vietnam. The dependent variable is GDP while independent variables are population (POP), precipitation (RAIN), temperature (TEMP), annual CO2 emissions (CO2) and Forest area (FORE). The result shows that five independent variables all have a statistically significant impact on the dependent variable, that means climate change has a negative impact on Vietnam's economic development. Based on this, the article proposes some recommendations to minimize the impact of climate change on economic development in Vietnam.***

• Keywords: *climate change, economy growth, Vietnam.*

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1. Introduction

Climate change refers to long-term changes in local, global or regional temperature and weather due to human activities. It now poses a serious risk to both human well-being and the continued existence of biodiversity. The two most frequent signs of climate change are an increase in the average global temperature and intense and unpredictable weather. It has now acquired the importance of global emergency. According to the report of the latest Intergovernmental Panel for Climate Change (AR6 Climate Change 2021), human-induced climate change as is prevalent now is unprecedented at least in the last 2000 years and is intensifying in every region across the globe (IPCC, 2021).

Vietnam is one of the most vulnerable countries to climate change in the world, ranking 127 out of 182 countries according to the Notre Dame Global Adaptation Initiative (ND-GAIN) and ranked 13th out of 180 countries in the Climate Risk Index of Germanwatch 2000-2021. Vietnam, which is placed 91st out of 192 countries on the ND-GAIN Readiness Index, is likewise ill-prepared to manage with severe occurrences, rising sea levels, and harsher temperatures. According to estimates, losses due to climate change were around 79,853 billion VND between 2001 and 2010 and approximately 245,339 billion VND (or almost 11 billion USD) between 2011 and 2022. The World Bank research group estimates that the effects of climate change will cost Vietnam more than $10 billion USD in 2021–2022, or 3.2% of its GDP. The magnitude of these losses, which are anticipated to rise quickly, highlights how urgent it is for Vietnam to adjust to the threats posed by climate change. Meanwhile, Vietnam's vulnerability to climate change stems from the accumulated stocks of GHGs in the atmosphere and the slow response of the largest polluters to reducing GHG emissions, the situation is aggravated by poor planning and unsustainable management of resources.

Therefore, the objectives of this article are: (1) To determine climatic change effect on economy growth of Vietnam; (2) To examine the effect of climate change such as: population, precipitation, temperature, annual CO2 emissions and Forest area on Vietnamese economy.

2. Theoretical basis

Clmate change is a long-term change in the typical or average weather of a region; in the last few decades, industrial and human activities have led to gradually accelerating changes in the climate, including an annually incremental increase in the average surface temperature, which has been defined as climate change (IPCC, 2014). The Intergovernmental Panel on Climate Change

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defines climate change as "a change in the state of the climate that can be identified… by changes in the mean and/or the variability of its properties and that persists for an extended period" (IPCC, 2018). Climate Change, global warming and more recently Climate Emergency have been, in the past decade and longer, terms synonymous with the greatest sustainability challenge of the 21st century (Munasinghe, 2010; Kyte, 2014; Princiotta and Loughlin, 2014; Martens et al., 2016). Changes observed in Earth's climate since the mid-20th century are driven by human activities, particularly fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere, raising Earth's average surface temperature. Natural processes, which have been overwhelmed by human activities, can also contribute to climate change, including internal variability (e.g., cyclical ocean patterns like El Niño, La Niña and the Pacific Decadal Oscillation) and external forcings (e.g., volcanic activity, changes in the Sun's energy output, variations in Earth's orbit) (Nasa, 2024).

Climate change also has noticeable negative impacts on other parts of the planet, like changes in ecosystems and desertification, rise in sea level, flooding, and drought (Hisano et al., 2018; Ouhamdouch et al., 2019). The way climate change impacts weather, the environment, animals, and agriculture affects humanity as well. Around the world, our ways of life from how we get our food to the industries around which our economies are based have all developed in the context of relatively stable climates. As global warming shakes this foundation, it promises to alter the very fabric of society. At worst, this could lead to widespread famine, disease, war, displacement, injury, and death. For many around the world, this grim forecast is already their reality. In this way, climate change poses an existential threat to all human life (NRDC, 2022). UN (2024) presents that climate change led to hotter temperatures, more severe storms, increased drought, a warming, rising ocean, loss of species and more health risks. Changes in the climate and increases in extreme weather events are among the reasons behind a global rise in hunger and poor nutrition. Climate change increases the factors that put and keep people in poverty. Floods may sweep away urban slums, destroying homes and livelihoods. Heat can make it difficult to work in outdoor jobs. Water scarcity may affect crops. As a result of climate change, some sectors of the economy may grow rapidly when compared with other economies and with improvements in the size and composition of their GDP. Different nations can become more diverse. Climate change also has a negative impact on the country's long-term growth prospects.

3. Literature review

Hitz and Smith (2004) assert that there is a direct correlation between energy usage and economic progress. Emissions of greenhouse gases (GHGs) rise in response to energy consumption. Analyses indicate that industrialized countries account for around 75% of global CO2 emissions. This result demonstrates how energy usage that leads to environmental deterioration affects economic development.

Fankhauser and Richard (2005), The economic impact of climate change is usually measured as the extent to which the climate of a given period affects social welfare which are saving and capital accumulation.

According to Hope (2006), climate change might offer some short-term benefits in certain industrialized economies but eventually have negative effects. The detrimental effects of temperature variations on GDP are identified by both theoretical and empirical indicators, according to Pindyck (2011).

Ebkom and Dahlberg (2008) present that there are connections between ecosystems, industrial growth, and climate change, as well as specific challenges related to each of them. Mahfuz (2014) found that the Southern part of Asia is experiencing catastrophic climate change, which is having an impact on the economy. The region's GDP is expected to decline to 8.8% by the year 2100.

Dell, Benjamin and Benjamin (2008) use annual variation in temperature and precipitation over the past 50 years to examine the impact of climatic changes on economic activity throughout the world. We find three primary results. Analysis of decade or longer climate shifts also shows substantial negative effects on growth in poor countries. Should future impacts of climate change mirror these historical effects, the negative impact on poor countries may be substantial.

According to Gornall et al. (2010), rising temperatures can have a significant effect on farm

income, agricultural output, and food security. The effects of climate change differ in humid and temperate locations. It is assumed that agricultural output will rise in middle- and high-latitude regions and then move northward; nevertheless, in many humid-region countries, the opposite is true.

Babatunde, Ayodele (2015), this article examines the empirical linkage between economic growth and climate change in Africa. Using annual data for 34 countries from 1961 to 2009, we find a negative impact of climate change on economic growth. Our results show that a 1°C increase in temperature reduces gross domestic product (GDP) growth by 0.67 percentage point. In addition to impact on Africa, this article provides estimates of the impact of climate change on GDP growth of these 34 countries, which can be valuable in appraising national adaptation plans.

Alagidede, Adu and Frimpong (2016). This study is a contribution to the empirics of climate change and its effect on sustainable economic growth in Sub-Saharan Africa (SSA). Using data on two climate variables: temperature and precipitation. Furthermore, we show that the relationship between real GDP per capita on one hand and temperature on the other is intrinsically nonlinear.

4. Research methods and data

This article applies a quantitative research by using secondary data of Vietnam from 1995 to 2023. The data was collected from World Bank, Tradingeconomics, General Statistics Office of Vietnam, ourworldindata.org. SPSS was used for data analysis and statistical methods such as Multiple Regression Analysis and Pearson Correlation was tested to examine the influence of climate variables on economic growth in Vietnam. The dependent variable is GDP while independent variables are population (POP), precipitation (RAIN), temperature (TEMP), annual CO2 emissions (CO2) and Forest area (FORE).

5. Results and discussion

5.1. Descriptive statistics of the variables

Table 1: Descriptive Statistics

Variable	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
GDP	24.66	408.80	4637.60	159.9172	132.60401	17583.822
POP	73.3	100.0	2651.0	91.414	7.5483	56.977
RAIN	1.67	1.89	52.60	1.8138	0.06554	0.004
TEMP	23.50	25.29	705.51	24.3279	0.61956	0.384
CO2	35.480	322.874	6114.075	210.83017	108.882602	11855.421
FORE	33	47	1122	38.68	4.317	18.639

Source: SPSS's result

The provided results show the descriptive statistics for several variables in the analysis:

GDP is with a mean of 159.9172, a standard deviation of 132.604, and values ranging from 24.66 to 408.80

POP is with a mean of 91.414, a standard deviation of 7.5483, and values ranging from 73.3 to 100.0

RAIN is with a mean of 1.8138, a standard deviation of 0.06554, and values ranging from 1.67 to 1.89

TEMP is with a mean of 24.3279, a standard deviation of 0.61956, and values ranging from 23.50 to 25.29

CO2 is with a mean of 210.83017, a standard deviation of 108.883, and values ranging from 35.48 to 322.874

FORE is with a mean of 38.68, a standard deviation of 4.317, and values ranging from 33 to 47

5.2. Correlation of variables

Table 2: Correlations

		POP	RAIN	TEMP	CO2	FORE	GDP
POP	Pearson Correlation	1	-0.578**	-0.580**	-0.568**	-0.647**	0.582**
	Sig. (2-tailed)		0.001	0.001	0.001	0.000	0.001
	N	29	29	29	29	29	29
RAIN	Pearson Correlation	-0.578**	1	0.579**	0.895**	0.593**	-0.940**
	Sig. (2-tailed)	0.001		0.001	0.000	0.001	0.000
	N	29	29	29	29	29	29
TEMP	Pearson Correlation	-0.580**	0.579**	1	0.655**	0.527**	-0.723**
	Sig. (2-tailed)	0.001	0.001		0.000	0.003	0.000
	N	29	29	29	29	29	29
CO2	Pearson Correlation	-0.568**	0.895**	0.655**	1	0.711**	-0.947**
	Sig. (2-tailed)	0.001	0.000	0.000		0.000	0.000
	N	29	29	29	29	29	29
FORE	Pearson Correlation	-0.647**	0.593**	0.527**	0.711**	1	-0.716**
	Sig. (2-tailed)	0.000	0.001	0.003	0.000		0.000
	N	29	29	29	29	29	29
GDP	Pearson Correlation	0.582**	-0.940**	-0.723**	-0.947**	-0.716**	1
	Sig. (2-tailed)	0.001	0.000	0.000	0.000	0.000	
	N	29	29	29	29	29	29

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

Source: SPSS's result

The significance of the variables population, precipitation, temperature, annual CO2 emissions and Forest area are all less than 0.05, so the variables are correlated.

5.3. Model Summary

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.985[a]	0.971	0.965	24.83110

a. Predictors: (Constant), FORE, TEMP, RAIN, POP, CO2

Source: SPSS's result

Adjusted R Square = 0.965 means the independent variables explain 96.5% of the dependent variable

5.4. ANOVA result

Table 4: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	478165.602	5	95633.120	155.102	0.000[b]
	Residual	14181.425	23	616.584		
	Total	492347.027	28			

a. Dependent Variable: GDP

b. Predictors: (Constant), FORE, TEMP, RAIN, POP, CO2

Source: SPSS's result

Based on table 4, test the hypothesis about the overall fit of the model, F value = 155.102 with sig.=0.000 < 5%. This proves that the R-squared of the population is different from 0. This means that the built linear regression model is suitable for the population.

5.5 Coefficients result

Table 5: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3702.948	466.833		7.932	0.000		
	POP	-1.999	0.918	-0.114	-2.179	0.040	0.459	2.179
	RAIN	-1103.313	169.327	-0.545	-6.516	0.000	0.179	5.593
	TEMP	-45.063	10.697	-0.211	-4.213	0.000	0.501	1.995
	CO2	-0.329	0.119	-0.270	-2.759	0.011	0.130	7.665
	FORE	-5.000	1.759	-0.163	-2.842	0.009	0.382	2.620

a. Dependent Variable: GDP

Source: SPSS's result

Table 5 shows that the values in the VIF column are less than 10 so there is no multicollinearity phenomenon.

Values in column Sig. are all less than 0.05, proving that the 5 independent variables all have a statistically significant impact on the dependent variable. Accepted hypothesis: Climate change has impact on Vietnam's economic development.

Coefficient B of POP = -1.999, meaning that when the POP variable increases by 1%, the GDP variable decreases by 1.999%.

Coefficient B of RAIN = -1103.313, meaning that when the RAIN variable increases by 1%, the GDP variable decreases by 1103.313%.

Coefficient B of TEMP = -45.063, meaning that when the TEMP variable increases by 1%, the GDP variable decreases by 45.063%.

Coefficient B of CO2 = -0.329, meaning that when the CO2 variable increases by 1%, the GDP variable decreases by 0.329%.

Coefficient B of FORE = -5, meaning that when the FORE variable increases by 1%, the GDP variable decreases by 5%.

The results are suitable with the current situation of economic growth in Vietnam. Vietnam is a country that suffers great damage from climate change. During the period 2011-2020, extreme climate caused serious economic damage, with total losses estimated at 229,958 billion VND (equivalent to 10 billion USD, according to 2022 exchange rates). Rising sea levels could cause $43 billion in damage to agriculture. The Mekong Delta is the region suffering the greatest loss, followed by the Red River Delta. About 1.1 million tons of aquaculture, equivalent to 935 million USD, are at risk of loss due to floods every year. Direct damage to public and private property, on average, each year Vietnam loses about 2.4 billion USD (equivalent to 0.8% of GDP) due to extreme weather events (Bao Chau, 2022).

Untill May 7, 2024, Vietnam has had 72 hail storms; Hail, lightning tornadoes and strong winds have caused a lot of economic, social and environmental damage. The flow on rivers and reservoirs in the Northern region is often 30-60% lower than the average of many years. Saltwater intrusion in the Southern region in the dry season of 2023-2024 has come earlier and more severely than the average for many years and 2022-2023. Recent episodes of saltwater intrusion have caused a local shortage of fresh water in some areas that do not have access to centralized water supplies in some coastal provinces (Natural Resource and Environment Communication Center, 2024). Post-disaster losses also include disease caused by contaminated water sources and mental health problems caused by psychological trauma and anxiety and stress. Climate change is also one of the causes of increased migration and forced tens of thousands of households to permanently relocate, posing the risk of losing cultural identity

and local knowledge. According to World Bank, climate change could cause Vietnam to lose about 12% to 14.5% of GDP each year by 2050 and could push up to one million people into extreme poverty by 2030. (Van, 2024)

6. Conclusion and policy implications

This article researchs impact of climatic change on Vietnamese economy growth from 1995 to 2023. The result of the correlation analysis shows a negative relationship between population, precipitation, temperature, annual CO2 emissions, forest area and GDP. In order to minimize the impact of climate change on economic development, Vietnam needs to well implement the following solutions such as:

Firstly, transforming the economic development model: Building a green, circular, environmentally friendly economy; restructure the economy, select appropriate economic sectors to focus on development; Improve the practicality and effectiveness of regional linkages in the overall economy, and convert plant and animal varieties. At the same time, it is necessary to transform the development model based on the ecosystem, respecting natural laws; proactively change the structure of crops, livestock, and farming methods to suit the ecological characteristics of regions and localities.

Secondly, performing well the task of strictly managing, protecting and restoring natural forests associated with biodiversity conservation, landscape protection and ecological environment. Strongly develop and improve the quality of planted forests, especially special-use forests, watershed protection forests, and coastal protection forests.

Thirdly, promoting cooperation with bilateral partners, international organizations and other multilateral partners, seek opportunities to receive financial and technological support, and strengthen capacity for responses with climate change in Vietnam.

Fourthly, it is necessary to strengthen communication and raise awareness at all levels, sectors and people, especially using appropriate communication channels and communication messages for vulnerable "groups" such as women, people with disabilities, ethnic minorities, people living in remote areas and areas prone to natural disasters... about the impact of climate change on safety and their livelihoods.

Fifthly, perfecting the legal system on environmental protection; In particular, there are strong sanctions to deter violators. Strengthen waste discharge monitoring, ensure compliance with technology and environmental protection regulations for industrial development projects. In addition, increasing the proportion of budget spending on environmental activities.

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EVALUATING THE EFFECTIVENESS OF TAX POLICIES IN REDUCING THE UNDERGROUND ECONOMY IN VIETNAM

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Abstract: ***Vietnam's underground economy, characterized by unregulated and unregistered activities, poses significant challenges to fiscal capacity, social equity, and economic development. Informality undermines government revenue, distorts competition, and restricts economic planning. This study aims to evaluate the effectiveness of various tax policy interventions Value Added Tax (VAT) reforms, business registration incentives, and enforcement measures in reducing informality in Vietnam. Specifically, the research addresses whether these policies effectively encourage informal enterprises to formalize, thereby improving tax compliance and economic transparency.The study employs a combined Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methodology to ensure robust causal inference. The analysis covers the period from 2012 to 2023, utilizing data from the General Statistics Office, Ministry of Finance, and World Bank Development Indicators. PSM is used to match comparable groups of enterprises, while DiD estimates the differential impact of policy interventions over time. Robustness checks, including placebo tests and sensitivity analyses, validate the findings. The findings reveal that VAT reforms and registration incentives significantly reduce informality, while enforcement measures are less effective. The study contributes to the literature by applying a novel PSM-DiD framework to the analysis of informality in an emerging economy context, providing evidence-based insights for policymakers. The results underscore the importance of balancing incentives and enforcement measures to promote sustainable formalization.***

• Keywords: *informality, policy interventions, PSM-DiD, tax reforms*

JEL codes: H25, H26, O17, C2

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1. Introduction

1.1. Background

The underground economy, encompassing unregulated and unregistered economic activities, plays a significant role in Vietnam's socio-economic landscape. Characterized by tax evasion and regulatory avoidance, this sector accounts for a substantial portion of the national GDP, providing employment opportunities but also creating challenges for fiscal management and economic growth (Schneider & Enste, 2020). Globally, underground economies are prevalent in developing and emerging markets, where institutional inefficiencies and weak enforcement mechanisms often drive informality (Medina & Schneider, 2018). In Vietnam, the underground economy is driven by several factors. High tax burdens discourage small businesses and individual entrepreneurs from formalizing operations, as they perceive formal sector participation as overly costly (Nguyen et al., 2021). Administrative hurdles further exacerbate informality, with lengthy and complex processes for business registration, licensing, and compliance acting as barriers (Le, 2020). Lastly, a lack of compliance incentives, such as tax relief or access to formal financing, reduces the perceived benefits of transitioning to the formal sector (Phan & Nguyen, 2019). Together, these drivers create an environment where informality becomes the default mode of operation for many enterprises, undermining broader economic goals.

1.2. Problem Statement

The underground economy poses significant challenges to Vietnam's fiscal capacity, social equity, and economic planning. Tax evasion deprives the government of crucial revenues, restricting its ability to fund infrastructure development and public services (World Bank, 2021). Social

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inequities are exacerbated as workers in the informal sector lack protections, such as healthcare benefits and job security (Nguyen & Le, 2022). From an economic perspective, informality complicates macroeconomic planning by creating data gaps and reducing the effectiveness of monetary and fiscal policies (Schneider, 2022). As Vietnam seeks to transition to a higher-income economy, addressing the prevalence of informality is essential to ensure sustainable and inclusive growth.

1.3. Objectives

This study aims to answer the key research question: How effective are VAT reforms, business registration incentives, and enforcement measures in reducing informality in Vietnam? It evaluates these tax policies' ability to encourage informal enterprises to formalize, thereby contributing to greater tax compliance and economic transparency. By focusing on the interplay of policy interventions and informality, the study provides actionable insights into which measures are most effective in Vietnam's context.

1.4. Methodology

The study employs a Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methodology to evaluate the impact of tax policies on informality. This integrated approach addresses selection bias and unobserved heterogeneity, enabling robust causal inference (Heckman et al., 1997; Abadie & Imbens, 2011). Data spanning 2012-2023 is sourced from the General Statistics Office, Ministry of Finance, and World Bank Development Indicators. PSM is used to create comparable groups of treated and untreated observations, while DiD estimates the differential impact of tax reforms over time. Robustness checks, including placebo tests and sensitivity analyses, validate the findings (Angrist & Pischke, 2021).

1.5. Contributions

This research makes significant contributions to the academic and policy domains. Methodologically, it pioneers the application of a combined PSM-DiD framework to analyze the informal economy in Vietnam. By integrating these methods, the study addresses critical issues of selection bias and endogeneity, providing a rigorous empirical basis for evaluating policy interventions (Imbens & Wooldridge, 2019). Empirically, the study fills a gap in the literature by focusing on Vietnam, where comprehensive analyses of informality and tax policy are scarce. The findings have practical implications, highlighting the effectiveness of VAT reforms and registration incentives compared to enforcement measures. The results suggest a need for a balanced approach, combining incentives for compliance with targeted enforcement to address larger informal enterprises (Le & Nguyen, 2023).

2. Literature Review

2.1. Theoretical Background

Theoretical frameworks on tax compliance and informality offer a foundational understanding of the factors influencing informal economic activities. The Allingham-Sandmo model (1972) is a cornerstone in tax compliance literature, positing that individuals weigh the costs of compliance such as tax payments against the expected benefits of evasion, factoring in penalties and detection probabilities. This rational-choice perspective underscores the importance of enforcement and incentives in shaping taxpayer behavior. Extensions of this model incorporate behavioral insights, highlighting the role of trust in institutions and perceived fairness in tax systems (Kirchler et al., 2008). Economic incentives play a critical role in formalizing informal enterprises. Incentive-based approaches, such as tax reductions or simplified registration processes, lower the perceived costs of formalization (Medina & Schneider, 2018). Conversely, high compliance costs, including administrative burdens and tax rates, act as barriers to formalization (Torgler, 2011). Enforcement measures, including audits and penalties, are also significant but can inadvertently drive informality if perceived as overly punitive (Slemrod, 2019). These theoretical perspectives provide a basis for evaluating the impact of tax policy reforms on informality.

2.2. Empirical Studies

Empirical studies demonstrate mixed outcomes regarding the impact of VAT reforms, incentives, and enforcement on reducing informality. Globally, VAT reforms have been found to enhance compliance when coupled with administrative simplifications. For example, studies in Latin America reveal that streamlined VAT systems reduced informality and increased tax revenues (Pomeranz, 2015; Kleven et al., 2016). Similarly, in Africa, VAT exemptions for small enterprises incentivized formalization while maintaining revenue neutrality (Bachas et al., 2021). Regionally, in Asia, evidence suggests that business registration incentives and simplified tax regimes

have been effective in encouraging formalization. In India, the introduction of the Goods and Services Tax (GST) reduced informality by integrating a significant portion of informal enterprises into the formal tax net (Narayan et al., 2020). However, overly stringent enforcement measures in some countries have led to unintended consequences, such as increased tax evasion or shifts to informal operations (Tanzi, 2019). Despite these findings, there remains limited consensus on the most effective combination of policies to reduce informality. The success of interventions often depends on contextual factors, including institutional capacity, enforcement mechanisms, and the socio-economic characteristics of the informal sector (Schneider & Enste, 2020).

2.3. Vietnam-Specific Research Gap

While the global and regional literature provides valuable insights, studies on Vietnam's informal economy remain scarce. The few existing analyses often focus on the descriptive characteristics of informality rather than evaluating specific policy impacts. For instance, Nguyen and Phan (2021) highlight the prevalence of informality in Vietnam's small and medium-sized enterprises (SMEs) but do not explore the causal effects of tax policies. Studies that do address policy impacts are typically limited in scope. For example, Le (2020) examines VAT reforms but does not consider complementary measures like business registration incentives or enforcement strategies. Moreover, most research on Vietnam lacks methodological rigor, with few employing causal inference techniques such as Propensity Score Matching (PSM) or Difference-in-Differences (DiD). This gap underscores the need for comprehensive evaluations that incorporate robust methodologies to assess the effectiveness of tax policies in reducing informality.

2.4. Research Hypothesis

Building on the theoretical and empirical literature, this study formulates the following hypotheses to evaluate the impact of tax policies on informality in Vietnam:

H1: VAT reforms significantly reduce informality by lowering compliance costs and simplifying tax procedures. H2: Business registration incentives are effective in encouraging informal enterprises to formalize by offering financial and administrative benefits. H3: Enforcement measures reduce informality by increasing the perceived costs of non-compliance. H4: The combined effect of VAT reforms, registration incentives, and enforcement measures is greater than the impact of any single policy intervention. H5: The effectiveness of these policies varies across sectors and regions, reflecting the heterogeneity of Vietnam's informal economy.

3. Methodology

3.1. Research Design

This study employs a Propensity Score Matching (PSM) and Difference-in-Differences (DiD) framework to evaluate the causal effects of tax policies on informality. The PSM method ensures that treated and untreated groups are comparable by matching observations based on observable characteristics, thereby addressing selection bias. DiD, on the other hand, estimates the difference in outcomes between treated and control groups before and after the intervention, mitigating the influence of unobserved time-invariant heterogeneity. The combination of PSM and DiD is particularly suited for this study because it allows for robust causal inference in non-randomized settings, such as policy interventions. By first matching comparable units and then analyzing treatment effects over time, this integrated approach reduces the risk of biased estimates stemming from both observable and unobservable confounders.

3.2. Research Model

The DiD model specification can be expressed as:

$$Y_{it} = \beta_0 + \beta_1 D_{it} + \beta_2 T_{it} + \beta_3 (T_{it} x\, D_{it}) + X_{it}\gamma + \epsilon_{it}$$

Y_{it} Outcome variables (e.g., informal employment rate, tax revenue deviations). D_{it} Treatment indicator (1 if the unit belongs to the treated group, 0 otherwise). T_{it} Time indicator (1 for the post-treatment period, 0 for the pre-treatment period). T_{it} x D_{it}: Interaction term capturing the treatment effect. X_{it}: Control variables. ϵ_{it}: Error term. The coefficient β_3 represents the DiD estimate of the treatment effect.

3.3. Data Sources

- The study utilizes panel data spanning 2015–2023, sourced from the following: General Statistics Office (GSO): Provides data on informal employment rates, unregistered enterprises, and regional economic activity. Ministry of Finance (MoF): Supplies information on tax revenue

deviations and enforcement measures. World Bank Development Indicators (WDI): Offers macroeconomic indicators and control variables such as GDP, inflation, and trade openness.

3.4. Variables

- Dependent Variables: Informal employment rate: Percentage of workers in the informal sector. Tax revenue deviations: Differences between expected and actual tax revenues. Unregistered enterprises: Number of businesses operating outside the formal sector.

- Independent Variables: VAT reforms: Implementation of simplified VAT procedures or rate changes. Registration incentives: Policies aimed at reducing the cost or complexity of business registration. Enforcement measures: Frequency and intensity of audits or penalties for non-compliance.

- Control Variables: GDP growth, inflation rate, trade openness, and regional development indicators.

3.5. Analytical Approach

- Propensity Score Calculation and Matching: Propensity scores are estimated using logistic regression models based on observable characteristics, such as firm size, sector, and location. Matching methods include nearest-neighbor, kernel, and caliper matching. Balance tests are conducted to ensure comparability between treated and control groups.

- Difference-in-Differences (DiD) Estimation: The matched samples are used to estimate the DiD model, isolating the impact of tax policies on informality. This approach ensures that differences in outcomes are attributable to the intervention rather than pre-existing trends.

- Robustness Checks: Placebo Tests: Apply the methodology to periods or groups not affected by the policies to confirm the absence of spurious effects. Sensitivity Analyses: Test the robustness of findings by varying matching algorithms, altering the caliper width, or excluding specific regions or sectors. Heterogeneity Analysis: Examine variations in treatment effects across sectors (e.g., manufacturing vs. services) and regions (urban vs. rural).

4. Research results

4.1. Descriptive Statistics of Informality Rates (Table 1)

Table 1: Descriptive statistics results

Year	Informality Rate (Treatment)	Informality Rate (Control)
2012	54%	54%
2013	53%	54%
2014	52%	54%
2015	51%	54%
2016	49%	53%
2017	46%	53%
2018	43%	52%
2019	40%	51%
2020	38%	50%
2021	37%	50%
2022	35%	49%
2023	33%	49%

The descriptive statistics in Table 1 illustrate the trends in informality rates for both treatment and control groups between 2012 and 2023. The treatment group, which was subject to targeted tax policy interventions, shows a consistent decline in informality. Starting at 54% in 2012, the informality rate for the treatment group dropped significantly to 33% by 2023. In contrast, the control group exhibited a much slower reduction in informality, declining only from 54% in 2012 to 49% in 2023. The disparity between the two groups after 2015 highlights the positive impact of the policy interventions on reducing informality among the treatment group.

4.2. Balance Test Results (PSM)

Table 2: Balance Test Results

Variable	Before Matching (Treatment Mean)	Before Matching (Control Mean)	After Matching (Treatment Mean)	After Matching (Control Mean)
Firm Size	14	18	14	14
Region	0.65	0.55	0.65	0.65
Sector	0.48	0.72	0.48	0.48
Age	9	11	9	9

Table 2 presents the results of the balance test using Propensity Score Matching (PSM). Before matching, the treatment and control groups exhibited significant differences across key variables such as firm size, region, sector, and age. For instance, the average firm size was 14 in the treatment group compared to 18 in the control group, and there were also notable differences in regional and sectoral composition. After matching, these differences were successfully minimized, indicating that the treatment and control groups became comparable across all observed variables. For example, after matching, the average firm size was equal (14) for both groups, and similar trends were observed for other variables, ensuring a more accurate causal analysis.

4.3. DiD Analysis Results

Table 3: DiD Analysis Results

Policy	Estimated Reduction (%)	Impact in Manufacturing (%)	Impact in Services (%)
VAT Reforms	9.8	11.2	8.1
Registration Incentives	7.6	8.4	6.7
Enforcement Measures	4.3	5.1	3.8

The results of the Difference-in-Differences (DiD) analysis are summarized in Table 3. Among the policy interventions analyzed, VAT Reforms proved to be the most effective in reducing informality, with an estimated reduction of 9.8% overall. Specifically, VAT reforms had a stronger impact on the manufacturing sector (11.2%) compared to the services sector (8.1%). Registration Incentives followed, with an overall estimated reduction of 7.6%, showing a slightly stronger impact in the manufacturing sector (8.4%) than in services (6.7%). Enforcement Measures had the lowest estimated reduction, with a 4.3% decrease in informality, with the impact being greater in manufacturing (5.1%) compared to services (3.8%). These results suggest that incentive-based approaches, such as VAT reforms and registration incentives, are more effective at reducing informality than punitive enforcement measures, especially in sectors like manufacturing. Overall, the findings from these tables indicate that targeted tax policy interventions have a significant impact on reducing informality, with VAT reforms and registration incentives being particularly effective. Moreover, the variation in the impact across sectors highlights the need for sector-specific policy considerations, especially for manufacturing versus service industries.

4.4. Robustness Checks

Robustness checks confirmed the reliability of the results. Placebo tests, which applied the DiD framework to periods before the interventions, showed no significant changes in informality rates, ruling out spurious effects. Sensitivity analyses, including alternative matching methods and varying caliper widths, produced consistent estimates, further validating the findings. These results provide robust evidence that targeted tax policies, particularly VAT reforms and registration incentives, can significantly reduce informality. However, the smaller impact of enforcement measures suggests that punitive approaches alone may be insufficient, emphasizing the need for a balanced strategy combining incentives and enforcement.

5. Discussion

5.1. Interpretation of Results

The findings of the study demonstrate that VAT reforms (H1) and registration incentives (H2) were significantly more effective in reducing informality compared to enforcement measures (H3). The success of VAT reforms can be attributed to their role in simplifying tax procedures and lowering compliance costs, which directly addresses the barriers to formalization faced by small and medium enterprises (SMEs). The reduction in compliance burdens aligns well with Hypothesis H1, which posits that VAT reforms would simplify formalization and therefore decrease informality. Registration incentives (H2) also proved effective by offering tangible benefits such as reduced costs and access to formal financial resources, providing a clear motivation for informal businesses to formalize. These incentives support the notion in Hypothesis H2 that financial and administrative support can encourage businesses to enter the formal economy. In contrast, enforcement measures (H3) had a relatively smaller impact. The limited success of punitive enforcement highlights the challenges in implementing strict measures without creating negative perceptions among informal enterprises. This suggests that punitive actions may deter compliance instead of encouraging it, thus supporting the partial validity of Hypothesis H3 regarding the limited efficacy of enforcement measures. Overall, Hypothesis H4 which posits that a combination of these interventions would have a greater impact was supported by the findings, indicating that VAT reforms and registration incentives, when applied together, can amplify the reduction in informality compared to individual interventions.

5.2. Comparison with Literature

The study's findings align with existing global studies but highlight some Vietnam-specific nuances. Globally, studies from Latin America and Africa have demonstrated that simplifying VAT and offering incentives can effectively reduce informality (Pomeranz, 2015; Kleven et al., 2016). This is consistent with Hypotheses H1 and H2, which are supported by evidence that tax simplification and incentives reduce the costs of formalization. However, in the Vietnamese context, enforcement measures (H3) showed limited success compared to other regions. In many countries, enforcement plays a more substantial role, but in Vietnam, smaller enterprises tend to be resistant to punitive

approaches due to lack of trust in governmental systems and the perceived threat to their viability. This outcome aligns with Hypothesis H5, suggesting that the effectiveness of these measures may vary based on sectoral and regional characteristics.

5.3. Policy Implications

Based on the findings, several policy implications can be drawn. First, scaling up VAT reforms and simplifying registration processes is recommended, as these measures directly align with Hypotheses H1 and H2, which suggest that lower compliance costs and easier registration will foster formalization. These reforms should be extended to additional sectors to further amplify their impact. Additionally, a targeted enforcement strategy focusing on larger informal firms is suggested. Larger enterprises are better equipped to bear the costs of compliance, making them suitable targets for enforcement measures. This aligns with the broader implication of Hypothesis H3, which recommends applying enforcement where it is most feasible and effective. Pairing enforcement with supportive measures such as compliance education can make these approaches more collaborative, encouraging formalization without excessive punitive actions.

5.4. Limitations and Future Research

While the study's methodology, including Propensity Score Matching (PSM) and Difference-in-Differences (DiD), provides robust causal inference, there are some limitations. The reliance on observable data may not fully capture unobserved factors such as social attitudes and cultural norms that impact informality. Additionally, the study lacked longitudinal analysis to assess the long-term effects of these interventions. Future research should address these limitations by exploring informal sector dynamics over an extended period, examining socio-cultural influences on formalization, and conducting cross-country comparisons particularly in Southeast Asia to gain further insights into different policy approaches and their effectiveness. This would also help validate Hypothesis H5 on the heterogeneity of policy impacts across regions and sectors, providing a more comprehensive understanding of informality in emerging economies.

Conclusion: This study aimed to evaluate the effectiveness of various tax policies VAT reforms, registration incentives, and enforcement measures in reducing informality in Vietnam's economy. Using a combined Propensity Score Matching (PSM) and Difference-in-Differences (DiD) methodology, the study assessed the causal impacts of these interventions on informal sector dynamics from 2012 to 2023. The findings indicate that VAT reforms and registration incentives significantly reduced informality, while enforcement measures had a more limited impact. The combination of these measures produced stronger results, supporting the need for a balanced policy approach. Based on the findings, key policy recommendations include scaling up VAT reforms and simplifying registration processes to encourage informal enterprises to transition into the formal economy. Positive incentives proved more effective than punitive enforcement, particularly in the manufacturing and services sectors. Additionally, a targeted enforcement strategy should be developed for larger informal firms, combining punitive measures with education and support to promote compliance. The study's lessons extend beyond Vietnam, offering valuable insights for other emerging economies facing similar challenges. Policies that prioritize reducing compliance costs and simplifying bureaucratic processes are likely to yield better formalization outcomes than those relying solely on enforcement. In conclusion, achieving sustainable formalization requires a balanced strategy that combines incentives and enforcement. Incentives such as VAT reforms and registration support create an enabling environment for informal businesses to formalize, while enforcement helps maintain compliance. Together, these measures can contribute to reducing informality, improving fiscal capacity, and ensuring more inclusive economic growth. The findings underscore the need for context-specific approaches that address the unique challenges of informality in emerging economies.

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THE CURRENT SITUATION OF THE APPLICATION AND THE FACTORS AFFECTING THE IMPLEMENTATION OF VIETNAMESE PUBLIC SECTOR ACCOUNTING STANDARDS IN NON-BUSINESS UNITS

PhD. Nguyen Thi Minh Giang*

Abstract: ***Vietnam's accounting system, particularly in the public sector, is experiencing significant changes to align with international regulations. Accordingly, the Ministry of Finance has been gradually issuing and implementing the Vietnamese public sector accounting standards to provide regulations and principles as a basis for recognizing, presenting, and disclosing information in line with international practices. However, the implementation is not straightforward due to the incompleteness of the issued standards. Additionally, public sector accounting, especially in non-business units, is governed by accounting standards, the accounting regime, and various other financial regulations. This article employs both qualitative and quantitative research methods to examine the current state of application and the factors influencing the adoption of Vietnamese public sector accounting standards in non-business units. The research results identify four factors affecting the adoption of Vietnamese public sector accounting standards in non-business units. These factors include the accountants' qualifications and experience, their awareness of usefulness, coercive pressure, and the legal documentation system. The article proposes recommendations to enhance the application of public sector accounting standards in non-business units. This will contribute to information transparency and improve the accountability of these units.***

• Keywords: *influencing factors, Vietnam public sector accounting standard, non - business unit.*

JEL codes: M41, H83

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1. Introduction

In the context of economic integration, the trend toward accounting integration is inevitable, especially in the public sector. The demand for transparent and comparable information, in line with international trends, requires public sector accounting in general, and particularly in non-business units, to have unified principles for recognizing, presenting, and disclosing information. Therefore, Vietnamese accounting must have a unified system of public sector accounting standards. Responding to this need, from 2021 to now, the Ministry of Finance has issued 11 Vietnamese Public Sector Accounting Standards (VPSAS) over two issuance periods, based on international public sector accounting standards. These standards aim to improve the legal framework for finance and accounting and to enhance the accountability of entities in the public sector, including non-business units.

The issued Vietnamese Public Sector Accounting Standards include:

First batch consisting of 5 standards:

VPSAS 01 "Presentation of Financial Statements"

VPSAS 02 "Cash Flow Statements"

VPSAS 12 "Inventories"

VPSAS 17 "Property, Plant, and Equipment"

VPSAS 31 "Intangible Assets"

Second batch consisting of 6 standards:

VPSAS 05 "Borrowing Costs"

VPSAS 09 "Revenue from Exchange Transactions"

VPSAS 11 "Construction Contracts"

VPSAS 14 "Events After the Reporting Date"

VPSAS 23 "Revenue from Non-Exchange Transactions"

VPSAS 24 "Presentation of Budget Information in Financial Statements"

The issued VPSAS serves as the basis for accounting to record, present, and disclose transparent information,

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thereby enhancing accountability. However, applying these standards in practice is not straightforward. Currently, besides accounting standards, non-business unit accounting is also governed by numerous other financial regulations, such as the State Budget Law, Accounting Law, Asset Management Law, and specific accounting regimes for non-business units. These regulations often overlap and lack consistency, posing challenges for accounting implementation. Consequently, the adoption of accounting standards in non-business units is affected. The article employs qualitative and quantitative research methods to address two questions:

(i) What is the current extent of VPSAS application in non-business units?

(ii) What factors influence the application of VPSAS in non-business units?

2. Theoretical background and hypotheses development

2.1. Theoretical background

Theory of planned behavior

According to Icek Ajzen (1991), there are three factors explaining behavior: (i) Attitude (one's opinion about the behavior); (ii) Subjective norms (others' opinions about the behavior); (iii) Perceived behavioral control (confidence in one's ability to perform the behavior), as follows:

Attitude towards behavior refers to the extent to which the individual evaluates the behavior favorably or unfavorably. The second factor, subjective norms, encompasses social pressures that determine whether the behavior is performed or not. The third factor, intention, refers to perceived behavioral control, indicating the ease or difficulty of carrying out the behavior, influenced by past experiences and anticipated obstacles.

According to general principles, the more favorable the attitude and subjective norms toward a behavior, and the greater the perceived behavioral control, the stronger an individual's intention to perform that behavior is likely to be. The relative importance of attitude, subjective norms, and perceived behavioral control in predicting intentions varies depending on the behavior and the situation.

Subjective norms and perceived behavioral control predict intention, thereby predicting behavior. Attitude, subjective norms, and perceived behavioral control explain behavioral intention prior to its enactment. Intention is a strong predictor of actual behavior. The theory also posits that perceived behavioral control assesses the skills required to perform the behavior and the ability to overcome barriers. Therefore, perceived behavioral control is believed to directly influence behavior. Actual behavior leads to feedback regarding expectations of that behavior.

Therefore, in accordance with the theory of planned behavior, the individual's intention stands as the pivotal factor in predicting their actions. Intention arises from the interplay of attitude, subjective norms, and perceived behavioral control. If an individual has a clear intention to perform an action and feels capable of controlling their behavior, they are more likely to carry out that behavior.

When applying public sector accounting standards, accountants' attitudes and perceptions regarding the benefits or challenges of implementation can either facilitate or impede their adoption.

Decision usefulness theory:

In 1966, a committee established by the American Accounting Association (AAA) introduced the concept of decision-making usefulness into accounting theory. According to this committee, the most important criterion in selecting an accounting measurement method is the usefulness of accounting information to users. The usefulness of a decision should be evaluated based on the predictive ability of accounting information. The more accurately users can predict economic and financial events using accounting information, the more useful this information is to them. Therefore, the theory of useful information for decision-making stems from the goal of accounting, which is to provide useful information to users for making decisions. Based on this premise, we identify the qualitative characteristics of financial statements to ensure they provide relevant information that accurately and objectively reflects the entity's financial position. This information helps users assess past performance and predict future outcomes.

The theory of decision usefulness underpins the construction of the current theoretical framework for financial reporting standards and national and international accounting standards. This theory highlights that financial statements' primary purpose is to furnish users with relevant and beneficial information to facilitate economic decision-making. It clarifies that implementing accounting standards achieves the goal of supplying useful information to financial statement users.

2.2. Hypotheses development

Since it has only been issued recently and the promulgated standard system is still incomplete, there have not been many studies on the application of Vietnamese public sector accounting standards in general and at non-business units in particular. Regarding the current situation and factors affecting the application of the standards, most existing research focuses on the application of accounting standards in businesses. The hypotheses mentioned include:

Level and experience of accountants: In practice, the level of education and experience of accountants affect the performance of their duties. Accountants with high professional qualifications, who regularly update their knowledge and current regulations, and who have practical experience, will better apply public sector accounting standards. Ahmed Ebrahim & Fattah (2015) also emphasize that training and professional development of accountants facilitate the application of accounting standards. Accountants with high professional competence are more likely to apply standards effectively (Gernon, Meek & Mueller, 1987). In their studies, authors Tran Dinh Khoi Nguyen (2011), Dang Ngoc Hung (2016), and Nguyen Thi Ngoc Diep et al. (2020) all suggest that the level of education and experience of accountants influence the application of accounting standards in businesses. Therefore, the proposed hypothesis is:

Hypothesis H1: The level of education and experience of accountants have a positive impact on the application of Vietnamese public sector accounting standards.

Awareness of usefulness: Accountants' awareness of the usefulness of applying standards and providing truthful, objective information to users will promote the behavior of applying public sector accounting standards in non-business units. Viet Le (2023) suggests that awareness of usefulness significantly impacts the attitudes of practitioners (accountants) and influences the application of public sector accounting standards. Therefore, the hypothesis is formed:

Hypothesis H2: Awareness of usefulness has a positive impact on the application of Vietnamese public sector accounting standards.

Coercive pressure: In the context of international integration, the convergence of international accounting standards is an inevitable trend. This necessitates that public sector accounting, including non-business units, must have accounting standards to achieve unified principles in recognizing, presenting, and disclosing information, which units must comply with. According to Nguyen Thi Thu Hoan (2018), coercive pressure from regulatory authorities (such as tax authorities) will drive units to apply standards. The hypothesis established is:

Hypothesis H3: Coercive pressure has a positive impact on the application of Vietnamese public sector accounting standards.

- *Legal document system:* In Vietnam, the coexistence of the accounting regime and accounting standards affects the practical implementation of accounting work. Additionally, for non-business units, accounting is also governed by various other financial regulations such as the state budget Law, the Law on management and use of public assets, etc. Author Dang Ngoc Hung (2016) suggests that the complexity of the legal document system impacts the application of accounting standards. Therefore, the author proposes the hypothesis:

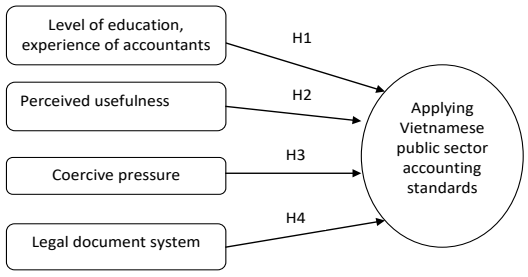
Hypothesis H4: The legal document system has a positive impact on the application of Vietnamese public sector accounting standards.

Table 1: Factors influencing the application of accounting standards

Variables	References	Variable code
Level of education, experience of accountants	Theory of planned behavior Expert interviews Gernon, H., Meek, G., & Mueller, G. (1987), Dang Ngoc Hung (2006), Nguyen Thi Ngoc Diep and colleagues (2020), Tran Dinh Khoi Nguyen (2011)	EX
Perceived usefulness	Theory of decision usefulness Expert interviews Viet Le (2023)	PU
Coercive pressure	Expert interviews Nguyen Thi Thu Hoan (2018), Viet Le (2023)	CP
Legal document system	Expert interviews Dang Ngoc Hung (2016), Nguyen Thi Phuong Thao (2018)	LD

Based on the research hypotheses from previous studies combined with expert interviews and grounded theory, and considering the characteristics of non-business units, the author proposes a model to study the factors influencing the application of Vietnamese public sector accounting standards in non-business units as follows:

Figure 1: The research model



Source: Author's proposed model

3. Methodology

The researchers conducted the study using a combination of qualitative and quantitative research methods. During the process, the author conducted in-depth interviews with experts who are faculty members specializing in public sector accounting at universities, as well as with accounting managers and accountants from three non-business units, in order to refine the initial questionnaire. The interviews covered questions aimed at assessing the implementation of Vietnamese Public Sector Accounting Standards (VPSAS) in these units, identifying challenges and advantages of applying VPSAS, and identifying factors influencing its application.

After developing the formal questionnaire, the author administered surveys to accounting managers and accountants in the non-business units using various methods, including Google Forms and direct paper surveys, to collect data on two main questions: (i) the current status of VPSAS implementation in the units, and (ii) factors influencing the application of VPSAS in these units.

Based on the qualitative research results, to answer the first question, the author employed descriptive statistical methods to reflect the current level of adoption of VPSAS in the non-business units. For the second question, leveraging the proposed research model and collected data, the author conducted scale validation, exploratory factor analysis (EFA), and regression analysis using SPSS software to determine the impact of factors on the application of VPSAS. This analysis formed the basis for providing recommendations and suggestions to promote the implementation of VPSAS in non-business units.

Regarding sample size, according to Hair et al. (2006), the minimum sample size for analysis is 50, with the ratio of observations to variables being 5:1 or higher. The author's survey included 19 observed variables, so the minimum sample size required is 95. To account for invalid survey responses, the author conducted a survey and collected 151 responses, of which 143 were valid and included in the analysis.

4. Results

Desciption of respondents

Figure 2 shows that the survey subjects were accountants (accounting for 85%) and chief accountants (accounting for 15%) (Figure 2) in non-business units, including schools (accounting for 61%), medical centers and hospitals (accounting for 24%), and the remaining in cultural agencies (Figure 3).

Figure 2: Survey subjects' job position ratios

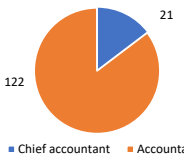
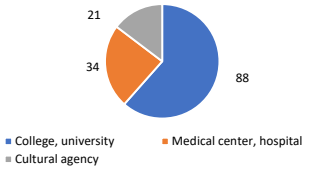


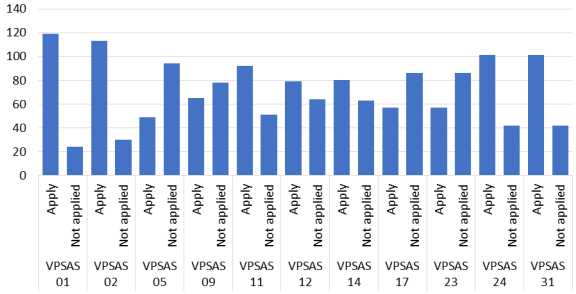
Figure 3: Surveyed non-business unit type ratios



The survey results show that in non-business units, most accountants have a high level of education, with 94,4% holding a university degree or higher, while the remaining subjects have intermediate or college-level education. The accountants also tend to be relatively experienced: 12,58% of the survey subjects have over 20 years of experience; 32,2% have between 10 and 20 years of experience; 39,1% have between 5 and 10 years of experience, and the rest have less than 5 years of experience.

Regarding the application of VPSAS:

Figure 4: The level of VPSAS application in non-business units



Overall, figure 4 shows that VPSAS 01 (Presentation of Financial Statements), VPSAS 02 (Cash Flow Statements), VPSAS 24 (Presentation of Budget Information in Financial Statements), and VPSAS 31 (Intangible Assets) are the standards most commonly and comprehensively applied in non-business units compared to other standards. In the first round, VPSAS 01, 02, and 31, which are based on international public sector accounting standards (IPSAS) and closely resemble Vietnam's financial mechanisms, were issued. However, VPSAS 09, 11, and 12 either remain unused or have been inadequately applied.

Among these, VPSAS 09 (Revenue from Exchange Transactions), VPSAS 11 (Construction Contracts), VPSAS 12 (Inventories), and VPSAS 14 (Events After the Reporting Date) have a relatively high rate of units that have not applied or have insufficiently applied these standards. VPSAS 05

(Borrowing Costs), VPSAS 17 (Property, Plant, and Equipment), and VPSAS 23 (Revenue from Non-Exchange Transactions) are also standards that have not been fully applied by many units.

The survey reveals several reasons for the non-application of VPSAS, such as not fully understanding the standards' content (20,9%) or encountering difficulties due to a lack of guidelines or inconsistent guidelines (18,2%). The remaining non-applications are because the related transactions do not occur in the units. This is consistent as non-business units mainly comprise schools, hospitals, etc., where transactions related to borrowing costs (VPSAS 05), revenue from exchange transactions (VPSAS 09), and construction contracts (VPSAS 11) rarely or never occur. Additionally, the accounting of many items outside the standards' provisions is influenced by the current financial mechanism. For example, fixed asset accounting for non-business units is governed by the Law on management and use of public assets; revenue accounting from non-exchange transactions is regulated by the government's aid management and usage regulations, the Law on fees and charges, etc., making the application of VPSAS challenging.

Another reason for some units not implementing the new aspects of the standards compared to current regulations is that, according to the survey, there are still instances where accountants perform their tasks based on habit and directives from superiors, without exploring the issued standards (accounting for 3%). Very few accountants have studied the entire system of issued standards; most only research the standards relevant to the transactions occurring in their units (accounting for 91,6%). This can partly be explained by the fact that nearly 25% of accountants in non-business units find the content of the current Vietnamese public sector accounting standards difficult to understand.

Although there are still cases where units have not fully implemented the standards, from the perspective of those involved in recording and providing information, 100% of the surveyed accountants acknowledge that applying the standards will help the unit provide more transparent information. This facilitates the consolidation process for financial reporting and ensures that the information is more suitable to support decision-making.

Cronbach's Alpha results

The results of reliability testing of the scale show that all factors have Cronbach's Alpha coefficients quite high (>0,8), meeting the reliability requirement. The total inter-item correlations of the scales are all >0,3, reaching a relatively high level from 0,651 to 0,899, indicating that the 19 observed variables are reliable and suitable for exploratory factor analysis (EFA).

Table 2: Cronbach's Alpha results

No	Observed variables	Corrected Item - Total correlation	Cronbach's Alpha if Item deleted
	Education level and experience of accountants, *Cronbach's Alpha = 0,922*		
1	EX1	0,750	0,921
2	EX2	0,869	0,883
3	EX3	0,890	0,873
4	EX4	0,776	0,914
	Perception of usefulness, *Cronbach's Alpha = 0,945*		
1	PU1	0,890	0,921
2	PU2	0,841	0,937
3	PU3	0,899	0,918
4	PU4	0,843	0,936
	Coercive pressure, *Cronbach's Alpha = 0,926*		
1	CP1	0,842	0,901
2	CP2	0,865	0,881
3	CP3	0,849	0,898
	Legal document system, *Cronbach's Alpha = 0,92*		
1	LD1	0,769	0,911
2	LD2	0,832	0,890
3	LD3	0,842	0,887
4	LD4	0,821	0,894
	Application of VPSAS, *Cronbach's Alpha = 0,866*		
1	AV1	0,709	0,834
2	AV2	0,651	0,859
3	AV3	0,732	0,822
4	AV4	0,787	0,800

Source: Author's analysis

Results of EFA analysis

Results of factor analysis for independent variables

The analysis results show that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for the independent variables is 0,734, which is greater than 0,5, indicating that the data used for factor analysis are suitable. The Bartlett's Test of Sphericity yielded a Chi-square value of 2391.968 with a significance level (Sig) of 0.000 < 0.05, demonstrating that the observed variables are correlated with each other in the overall dataset.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.734
Bartlett's Test of Sphericity	Approx. Chi-Square	2391.968
	df	105
	Sig.	.000

Principal components analysis using Varimax rotation grouped the initial observed variables into 4 components. The total variance explained was 84,472%, which exceeds the threshold of 50%, meeting the requirement. The Eigenvalues for all factors were >1, with the lowest Eigenvalue for the fourth factor being 1.630.

Table 3: Results of factor analysis for independent variables

	Component			
	1	2	3	4
PU1	0,907			
PU3	0,897			
PU2	0,891			
PU4	0,861			
LD2		0,878		
LD3		0,861		
LD4		0,856		
LD1		0,856		
EX2			0,878	
EX1			0,866	
EX3			0,863	
EX4			0,805	
CP3				0,915
CP2				0,899
CP1				0,891
Eigenvalue	6,578	2,314	2,149	1,630
% of variance	43,852	15,427	14,329	10,863

Source: Author's analysis

The factor loadings were all >0.5. Variable EX4, although loaded on two factors, showed a strong loading on Factor 3 (0,805) and a relatively low loading on Factor 2 (0,307), so this variable was retained and classified under Factor 3. Furthermore, there was no cross-loading among factors, hence after factor analysis, the four independent factors remained unchanged.

Results of factor analysis for dependent variables

The results of the exploratory factor analysis for the dependent variable showed a KMO value of 0,805 and Bartlett's Test of Sphericity reaching 279,798 with a significance level of Sig. = 0,000 < 0,05, indicating significant correlations among the observed variables overall. The factor loadings for the scale items were all >0,5.

Table 4: Results of factor analysis for dependent variables

	Extraction
AV1	0,710
AV2	0,634
AV3	0,740
AV4	0,790
Sig. = 0,000 Eingenvalue = 2,874 Cumulative (%) = 71,857	
KMO	0,805
Barlett's Test of sphericity	Approx. Chi-Square 279,798 Sig. 0,000

Source: Author's analysis

Results of linear regression analysis

The results of the regression analysis indicate the influence of independent variables on the adoption of accounting standards, with an R-squared value of 0,560 and adjusted R-squared of 0,547, indicating that the four independent variables included in the model explain 54,7% of the variance in the dependent variable. The remaining 45,3% is attributed to natural error and variables outside the model.

The value of F = 43,892 with Sig. = 0,000 < 0,05 indicates that we can conclude the overall R-squared is different from 0, therefore, the linear regression model can be generalized and applied to the population. The Sig. values of the t-tests are all less than 0,05, indicating that all independent variables have statistically significant effects on the dependent variable. The Variance Inflation Factor (VIF) values are all less than 2, suggesting that these independent variables are not closely related to each other, thus there is no multicollinearity issue (Field, 2009). The Durbin-Watson statistic has a value of 1,965 < 3, indicating no autocorrelation issue in the model.

Table 5: Results of multiple regression

	Unstandardized Coefficients		Standardized Coefficients	t	Sig	Collinearity	
	B	Std.Error	Beta			Tolerance	VIF
(Constant)	0,748	0,236		3,161	0,002		
EX	0,206	0,057	0,243	3,622	0,000	0,711	1,407
PU	0,296	0,051	0,379	5,848	0,000	0,761	1,315
CP	0,161	0,051	0,198	3,151	0,002	0,807	1,240
LD	0,158	0,050	0,206	3,172	0,002	0,757	1,321
R Square					0,560		
Adjusted R Square					0,547		
Std. Error of the estimate					0,31788		
Durbin - Watson					1,965		

Source: Author's analysis

The results of the linear regression analysis on the relationship between the factors indicate that the 4 independent variables including Education level and experience of accountants, Perception of usefulness, Coercive pressure, Legal document system all have a positive relationship with the dependent variable, the application of Vietnam's public accounting standards.

Multivarate regression formula:

Y = 0,206X1 + 0,296X2 + 0,161X3 + 0,158X4

Trong đó:

Y: Application of Vietnam's public accounting standards

X1: Education level and experience of accountants

X2: Perception of usefulness

X3: Coercive pressure

X4: Legal document system

Linear regression analysis results show that the factor exerting the greatest influence on the extent of applying Vietnamese Public Sector Accounting Standards (VPSAS) is perceived usefulness, with a standardized beta coefficient of 0,379. Following

this are the factors of accountant's qualifications and experience (0,243), legal document system (0,206), and coercive pressure (0,198).

5. Conclusion and Recommendations

Survey results suggest that the implementation of Vietnam Public Sector Accounting Standards (VPSAS) in enterprises encounters limitations due to both subjective and objective factors. Subjective factors include cases where accountants have not fully studied and understood the standards' provisions. Objective factors stem from existing regulations, which are often ambiguous, and the complexity of expressing the standards, which poses challenges for readers and implementers alike.

The quantitative research results have identified the impact of four factors: Education level and experience of accountants, perception of usefulness, regulatory pressure, and the legal document system on the application of VPSAS in enterprises, each varying in their degree of influence. Based on these findings, the author proposes several recommendations to enhance the application of VPSAS in enterprises to ensure transparent, objective, and comparable information:

- Perception of usefulness is a critical factor influencing the adoption of VPSAS in enterprises because understanding leads to action. Therefore, proactive application of VPSAS by accountants demands advisory support from professional organizations and regulatory bodies to clarify the role and significance of adhering to accounting standards in recording, presenting, and providing information to stakeholders, thereby aiding decision-making and enhancing accountability.

- Education level and experience of accountants: This factor significantly affects the adoption of VPSAS in enterprises, necessitating continuous training of accounting professionals within the public sector and specifically at enterprises. Training programs must regularly update current regulations, especially those pertaining to newly issued accounting standards. These standards, rules, and financial regulations should be incorporated into educational curricula with appropriate duration. Additionally, individual accountants should continuously update their knowledge and participate in professional training sessions to grasp the essence of accounting standards, facilitating easier adoption and accurate recording, presentation, and disclosure of information.

- Regulatory pressure: This legal factor facilitates the implementation of VPSAS. For this issue, superior units and functional agencies need specific regulations to enforce compliance with VPSAS in accounting activities within enterprises. This includes principles for recording economic transactions, the timing of financial reporting, and the content of financial reports. Moreover, regular inspections, audits, and enforcement actions are necessary to enable enterprises to proactively and effectively comply with current financial accounting laws.

- Legal document system on accounting and finance: In Vietnam, the public sector accounting system and enterprise management systems often overlap and are also subject to financial regulations. Therefore, to ensure the comprehensive adoption of accounting standards, the Ministry of Finance and relevant ministries should review existing regulations and eliminate inconsistencies. Amendments or replacements should align regulations with accounting standards, ensuring uniformity, consistency, and rationality. Furthermore, the Ministry of Finance should promptly issue guidelines on standards and explain related provisions to facilitate easier implementation and application by accounting professionals.

In general, Vietnam's issuance and requirements for the adoption of VPSAS are a necessary and logical trend. In the near future, Vietnam will continue to issue new standards to improve the legal framework of accounting for the public sector and enterprises. Consequently, the full application of these accounting standards is essential, necessitating concrete actions from accountants, the Ministry of Finance, and relevant agencies to practically implement them. This effort aims to provide transparent, objective, and accountable information.

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FACTORS INFLUENCING CUSTOMER SATISFACTION IN DIGITAL BANKING: THE CASE STUDY OF VIETNAM

PhD. Ngo Duc Tien*

Abstract: ***The satisfaction of customers is a crucial determinant of the success or failure of commercial banks in Vietnam. The primary aim of this study is to discover the crucial aspects that have a substantial impact on the happiness of individual consumers about digital banking services offered by Vietnamese commercial banks. For this study, we conducted a survey of 290 individual customers from multiple commercial banks in Vietnam. The findings from the Exploratory Factor Analysis (EFA) revealed that the pleasure of individual customers was highly influenced by five factors: Tangibles, Responsiveness, Empathy, Reliability, and Assurance. Hence, the results of this study have consequences for the development of solutions, aiming to enhance digital banking services for individual clients in commercial banks in Vietnam.***

• Keywords: *digital banking service, digital banking, customer satisfaction, Vietnam, commercial bank, exploratory factor analysis.*

JEL codes: G20, G21, G24

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1. Introduction

With a population of almost 98 million people (General Statistical Office, 2021) and a huge number of Internet users, as well as a pervasive telecommunications and Internet infrastructure, Vietnam has great potential for the development of its digital economy. The number of Internet users in Vietnam has surpassed 72,1 million as of January 2022, representing more than 70 percent of the country's population (Ministry of information and communications, 2022). According to the European Center for Digital Competitiveness's "*Digital Riser Report 2021*," Vietnam was the leading Digital Riser among East Asian and Pacific nations. The Vietnamese government's "*National Digital Transformation Program toward 2025, vision to 2030*" has resulted in the country achieving this unprecedented milestone. This program aims to experiment with new technologies and models, modernize business and procedures, restructure government operations, and provide a safe, secure, and humane digital environment.

The banking industry in the Vietnamese economy is one of the most crucial pillars supporting the country's digital transformation. The Vietnamese government viewed the banking industry as playing the primary role in enforcing cashless payment adoption in Vietnam, and ensuring the success and convenience of digital transactions. Therefore, in 2021, the Vietnamese Prime Minister accelerated the digital transformation of the banking system in Vietnam with the "*Project on development of non-cash payments in Vietnam for the period of 2021-2025*" and the State Bank of Vietnam's Decision No. 810/QD approving the "*Plan for digital transformation of the banking sector to 2025, with a vision to 2030*". In addition, the Covid epidemic has altered the Vietnamese customer's purchasing behavior. Due to the fact that intimate contact might lead to serious illness or death, the primary duty of service sectors during a pandemic was to make customers feel safe and embraced (Berry et al. 2020). Then, consumers have to use the online services more than in the past, leading to the fact that they value the convenience and speed that digital channels offer (Grima et al., 2020). Hence, digital banking transactions are increasingly preferred in Vietnam instead of face-to-face transactions and then, utilizing digital banking services will become a permanent habit for them.

Through the development of digital banking services, commercial banks in Vietnam today have excellent prospects to increase their market share. A number of Vietnamese commercial banks have issued strategies for delivering improved digital banking services. And, it is vital to rethink all internal procedures, with a focus on customer satisfactory, and consider how they will operate

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in a digital world. (Girlando et al, 2021; Pavia et al, 2021). Based on the demand of understanding the factors influencing customer satisfaction with digital banking services from commercial banks in Vietnam, the author conducted a research to determine the impact intensity of digital banking service quality on customer satisfaction in Vietnam, by subjecting it to the five dimensions of service quality suggested in the SERVQUAL model provided by Parasuraman et al (1998) and Zeithaml et al (1990).

The structure of this paper includes five parts as follows. The first part is an introduction that presents the reason for topic selection. The next part is a literature review and hypotheses relating to the study. Then the third part describes the methodology. The empirical results follow. Finally, the last section presents the conclusions from the results obtained.

2. Literature review and Hypotheses

2.1. Literature review

Digital banking

Many banks use digital banking to withstand intense competition (Alalwan, Dwivedi, & Rana, 2017). It might be challenging to differentiate between "digital banking" and other terms such as "mobile banking" and "online banking." They all require the use of digital apps. Yet, there has not been sufficient agreement on the definition of "digital banking" or "digital bank." This banking system offers electronic services via digital technology for phone banking, SMS banking, mobile banking, and internet banking (Sardana & Singhania, 2018). Clients can conduct banking transactions over the phone by contacting the bank's contact centre. The bank has provided either specialised personnel or automated programmes for completing consumer transactions. Using the Short Messaging Service (SMS) format, customers can execute financial transactions on their mobile phones (cellphones). Using their mobile devices, customers can utilise bank-installed programmes or send SMS to bank phone numbers.

According to M.Murugeswarie (2018), digital banking can be known as a new concept in the field of electronic banking that aims to enhance standard online and mobile banking services by integrating digital technologies, such as strategic analytics tools, social media interactions, innovative payment solutions, mobile technology, and an emphasis on the user experience. In addition, Epstein (2017) also provides the definition of digital banking as the use of technology to provide seamless end-to-end processing of banking transactions/operations; started by the customer, assuring maximum utility to the client in terms of availability, usefulness, and cost; to the bank in terms of decreased operational costs, zero errors, and improved services.

SERVQUAL model in banking sector

Over the past two decades, numerous academics have utilised the SERVQUAL model to assess the quality of banking services (see Loonam & O'Loughlin, 2008; Amiri Aghdaie, S., & Faghani, F., 2012; Carrasco et al, 2012; and Dasharathraj K Shetty et al, 2022). According to Parasuraman et al. (1994) and Zeithaml et al. (1990), there are five key dimensions that may be indicative of service quality: tangibility, dependability, responsiveness, assurance, and empathy, which will effect on the customer satisfaction with the services. These five dimensions will be described in detail in the table 1.

Service quality: Following the research of Royne Stafford, Stafford & Wells (1998), the importance of service quality is largely for financial service providers who often offer standardised products. In order to develop an all-encompassing appraisal of an organisation, its management must connect its performance to the expectations of its consumers and compare its own performance to that of other organisations in the same industry (Rauch et al., 2015). Researchers determine the definition of service quality, recognising that service delivery can align with, meet, or exceed the needs of consumers.

Customer satisfaction: Satisfaction is likewise a standout amongst the most essential elements to define any type of interaction between members and a buyer's satisfaction reaction (Oliver, 1997). Customer satisfaction can be described as the fulfilment of a customer's needs and anticipations (Kaur et al., 2021). Customers have specific expectations when purchasing a product or employing a service. If the product or service satisfies the customer's expectations, he or she will be pleased and satisfied. So, customer satisfaction may also be viewed as a result of service quality, which indicates that it is positively correlated with the nature of the products or services provided to the consumer.

To determine the key dimensions influencing the customer satisfaction with online banking or mobile banking services, different scholars employed SERVQUAL model.

Table 1: The description of five key dimensions in SERVQUAL model

Dimension	Description
Tangibility	According to Parasuraman et al. (1994), tangibility represents to physical facilities (equipment, personnel, and communications materials). Customers will evaluate the quality of a service based on its outward appearance. With digital banking services, tangibility could include bank offices, updated equipment, a website, and interactions with personnel. Maintaining communication between the staff and client is facilitated by tangibility, which ultimately increases customer satisfaction.
Reliability	Reliability refers to the capability of service providers to execute services as promised dependably and precisely. Generally, reliability denotes that a company delivers the services it has promised, including service provision, pricing, delivery, and problem resolution (Parasuraman et al., 1994, Jordaan & Prinsloo, 2001; Wilson et al., 2016). In the banking sector, for example, error-free transaction or timely updates of account could help the banks achieve the reliability from their clients with digital banking services. There exists an association between service quality and client satisfaction.
Responsiveness	Responsiveness means the willingness of the service providers to help their clients and provide instant service (Parasuraman et al., 1994). The clients using digital banking services will evaluate the responsiveness of their banks by the length of time they have to wait for assistance, answers to inquiries or thoughtfulness regarding issues. Hence, the responsiveness might help to improve the service quality (Zeithaml & Bitner, 2003).
Assurance	Assurance denotes the attitudes and conduct of employees, as well as the staff's capacity to provide helpful, secure, professional, and knowledgeable services (Parasuraman et al., 1994). Then, assurance with digital banking service is concerned with assuring safety, risk-free conditions, and client confidence (Kaur et al., 2021).
Empathy	Empathy means that the organization offers its clients their thoughtful and personalized services (Parasuraman et al., 1988). By another way, empathy illustrates the framework for providing clients with personalised consideration (Khan, Lima & Mahmud, 2021). The clients might enjoy the empathy of digital banking services by the sound behavior, sympathetic and politely from banks' staff.

Source: Author's compilation

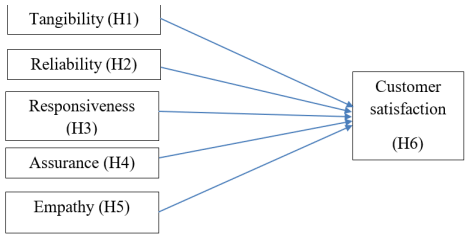
From the research of Lau, Cheung, Lam, and Chu (2013), the five dimensions such as empathy, tangibility, responsiveness, reliability, and assurance were proved to effect be significantly on customer satisfaction with banking services in Hong Kong. Besides, Kumar, Kee, and Charles (2010) reexamined the SERVQUAL model to determine (if any) differences in service quality between conventional and Islamic banks. In addition, the technique of dominance analysis is employed to assess the relative significance of the essential components in closing the overall service quality gap between these two types of banks.

The research of Amiri Aghdaie and Faghani (2012) showed that there were four variables, namely tangibility, reliability, responsiveness and empathy impacting significantly on the satisfaction of clients ussing mobile banking services in Iran while the assurance factor would have no relationship with customer satifaction. And Rahma, Abdullah and Rahman (2017) revealed the same result when using SERVQUAL model to evaluate the effect of its variables on the customer satisfaction of mobile banking in Bangladesh. However, when Khan, Lima and Mahmud (2021) conducted another survey to assess the effect of five dimensions of SERVQUAL model on customer satisfaction of mobile banking in Bangladesh, the result of this research is different. Five variables including tangibility, reliability, responsiveness, assurance, and empathy influence on the customer satisfaction for using mobile banking in Bangladesh.

Digital banking services might be determined as the development of online banking or mobile banking services. Vietnamese traditional banks need to conduct digital transformation to catch up with the demand of the domestic clients (Nguyen, 2020; Tran, 2021). Thus, it is evident that digital transformation forces banks to reconsider how they connect with clients and how they will meet customer needs. Analyzing the impact of five traditional variables from the SERVQUAL model on customer satisfaction with digital banking services will advise that Vietnamese banks adopt a fundamental strategy to digitalize their operations in accordance with customer demand.

2.2. Hyphotheses

Figure 1: Proposed research model



Source: Prepared by the author

Hypothesis 1 (H1): The tangibility factor has a significant impact on customer satisfaction in digital banking.

Hypothesis 2 (H2): The reliability factor has a significant impact on customer satisfaction in digital banking.

Hypothesis 3 (H3): The responsiveness factor aspect has a significant impact on customer satisfaction in digital banking.

Hypothesis 4 (H4): The assurance factor has a significant impact on customer satisfaction in digital banking.

Hypothesis 5 (H5): The empathy factor has a significant impact on customer satisfaction in digital banking.

Hypothesis 6 (H6): Tangibility, Reliability, Assurance, Empathy and Responsiveness have a significant impact on customer satisfaction in digital banking.

3. Methodology

3.1. Research design

The statements used to assess the five dimensions in SERVQUAL models are determined after refering the previous studies (see Table 2). The author conducted the survey in December 2022 with Likert scale in which '5'=Most satisfied/Most likely, '4'=Satisfied/Likely, '3'=Neutral, '2'=Dissatisfied/unlikely, and '1'=Most dissatisfied/Highly unlikely.

Table 2: Factors and sources

Factors	Sources
Tangibility	
Tangibility 1: Digital banking facilitates transactions easily based on your requirements.	Kaur et al., (2021), Loonam & O'Loughlin, (2008), Parasuraman et al. (1988)
Tangibility 2: Digital banking delivers banking services that are convenient.	
Tangibility 3: Digital banking facilities are attractive to users.	
Tangibility 4: Digital banking facilities are modern.	
Tangibility 5: You are pleased with the bank's technologically advanced equipment.	
Reliability	
Reliability 1: Digital banking gives accurate and trustworthy information.	Kaur et al., (2021), Loonam & O'Loughlin, (2008), Parasuraman et al. (1988)
Reliability 2: Digital banking enables timely account maintenance and upgrades.	
Reliability 3: Digital banking delivers error-free transactions as promised.	
Reliability 4: Digital banking makes all services available whenever the client desires.	
Reliability 5: Digital banking provides accurate services on the first attempt.	
Responsiveness	
Responsiveness 1: Digital banking offers prompt confirmation of the ordered service.	Kaur et al., (2021), Loonam & O'Loughlin, (2008), Parasuraman et al. (1988)
Responsiveness 2: Digital banking can promptly and directly address client problems.	
Responsiveness 3: When an issue arises, the bank's website delivers pertinent information to consumers.	
Responsiveness 4: Digital banking immediately answers to requests and questions that are made by email or other ways.	
Responsiveness 5: In digital banking, the bank promptly resolves any issues that arise with your digital transactions.	
Assurance	
Assurance 1: You believe on the services provided by the bank.	Kaur et al., (2021), Loonam & O'Loughlin, (2008), Parasuraman et al. (1988)
Assurance 2: Digital banking facilitates the discovery of policy declarations and notices.	
Assurance 3: It is easy to remember the process of digital banking.	
Assurance 4: You feel safe when conducting digital transactions.	
Assurance 5: Your personal information in digital banking site is not shared with other sites.	
Empathy	
Empathy 1: When you have a problem, the bank demonstrates a genuine desire to help you resolve it.	Kaur et al., (2021), Loonam & O'Loughlin, (2008), Parasuraman et al. (1988)
Empathy 2: Whenever the need for a contract arises, you receive personalised service from bank personnel.	
Empathy 3: The bank employee understands your particular needs.	
Empathy 4: You always receive your account details via SMS, app notifications or email.	
Empathy 5: The bank pays for a problem that they have caused.	
Customer satisfaction	
Customer satisfaction: You are satisfied with digital banking.	Parasuraman et al. (1988)

Source: Prepared by the author

3.2. Data collection

The results were obtained by a methodical survey that specifically focused on clients from various banks who utilize banking services in Hanoi. The study was conducted between January and March 2023. The survey was conducted through many methods including self-administration via social media platforms like Facebook, verbal face-to-face meetings, phone interviews, and online communication platforms such as Zoom and MS Teams. The target audience for the study consisted of customers of banking services and products. We entered the data into a Microsoft Excel spreadsheet in order to calculate the descriptive frequencies of the participant demographics.

The final sample consisted of 290 individuals, with a relatively equal distribution between males (136) and females (154). The majority of participants were between the ages of 26 and 40 (168), followed by those aged 18 to 25 (36) and above 41 (86). The survey revealed that the largest group of participants were individuals who were self-employed, with a total of 137 respondents. This was followed by individuals who were actively employed, with 108 respondents. Additionally, there were 27 students and 18 participants who fell into the "other" category. The majority of participants, specifically 114 individuals, utilized digital banking services for a period exceeding 5 years. This was followed by 98 participants who used digital banking services for a duration ranging from 3 to 5 years, and 78 participants who had been using digital banking services for less than 3 years.

3.3. Data analysis techniques

The study employs IBM SPSS 23.0 statistical analysis software to conduct exploratory factor analysis (EFA) in order to determine the primary elements that influence individual consumer satisfaction with digital banking. The findings obtained from the EFA can be used as a foundation for suggesting potential measures to enhance the quality of digital banking services offered by joint stock commercial banks in Vietnam.

4. Results and discussion

4.1. Research result

Assessing the reliability of scales by Cronbach Alpha coefficient

Cronbach's Alpha coefficient and the EFA method are used to evaluate the scale and reliability of the observed variables. In order for the scale to be considered valid, it is necessary to eliminate variables that have a corrected item-total correlation coefficient below 0.3 and a Cronbach's Alpha coefficient for the factor group below 0.6. In the EFA (exploratory factor analysis), variables that have a factor loading coefficient below 0.5 will be eliminated from the scale due to their weak association with the underlying factor. To evaluate the model, it is necessary to do a multivariate regression analysis using a statistical significance level of 5%. The results of the scale quality test in Table 3 indicate that the Cronbach's Alpha coefficient for all the factor groups is above 0.6. The constructed scale system has 5 scales, which guarantee high quality, and encompasses 21 often observed variables.

Table 3. Summary of results of quality analysis of scales using Cronbach Alpha coefficient

No.	Variable group	Number of variables	Cronbach Alpha coefficient
1	Tangibility	5	0,809
2	Reliability	5	0,787
3	Responsiveness	5	0,752
4	Assurance	5	0,851
5	Empathy	5	0,779
6	Customer satisfaction	5	0,823

Source: Calculated from survey data in 2023

Result of EFA analysis

Testing the appropriateness of EFA

In Table 4, we have KMO=0,931, satisfying the condition 0.5<KMO<1, so exploratory factor analysis is suitable for real data.

Table 4: KMO and Bartlett test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0,931
Barlett's Test of Sphericity	Approx. Chi-Square	987,015
	df	210
	Sig.	0,000

Source: Calculated from survey data in 2023

Conducting a correlation test to analyze the relationship between observed variables in a representative measure. Table 4 indicates that Bartlett's test has a statistically significant level of Sig. = 0.000 < 0.05. This implies that the observed variables exhibit a linear correlation with the representative factor.

Model results

By conducting tests on the scale's quality and the EFA model, it was determined that there are 5 scales that represent the factors influencing individual customers' satisfaction with service quality, as well as 1 scale representing individual customers' satisfaction with digital banking (Table 5).

Table 5: Adjusted model through Cronbach Alpha test and EFA

No.	Scales	Observed variable
1	Tangibility (X1)	Tangibility 1; Tangibility 2; Tangibility 3; Tangibility 4.
2	Reliability (X2)	Reliability 1; Reliability 2; Reliability 3; Reliability 4.
3	Responsiveness (X3)	Responsiveness 1; Responsiveness 2; Responsiveness 3; Responsiveness 4; Responsiveness 5.
4	Assurance (X4)	Assurance 1; Assurance 2; Assurance 3; Assurance 4; Assurance 5.
5	Empathy (X5)	Empathy 1; Empathy 2; Empathy 3.
6	Customer satisfaction (Y)	Customer satisfaction

Source: Calculated from survey data in 2023

Multiple regression analysis

To identify factors affecting customer satisfaction with digital banking, the overall correlation model has the form: $Y=f(X_1, X_2, X_3, X_4, X_5)$ In which: Y: Dependent variable; X_1, X_2, X_3, X_4, X_5: Independent variables. Examining which factors from X1 to X5 have a significant impact on customer satisfaction with digital banking will be done using the linear regression equation:

$$Y= \beta_0 +\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

In which, the variables included in the regression analysis are determined by calculating the factor scores. Based on the analysis results from Table 6, the adjusted R^2 coefficient is 0,682, according to which the change in individual customer satisfaction with digital banking is explained by the independent variables of the model. Thus, it can be concluded that the proposed model is consistent with the actual data.

Table 6: Model summary

Independent variables	Unstandardized regression coefficient (B)	t	P-value	VIF	Standardized regression coefficient (Beta)	Contribution of variables (%)	Importance of variables
(Constant)	3,197	106,726***	0,000	1,000			
X_1	0,185	8,873***	0,000	1,000	0,2827	17,00	4
X_2	0,324	2,505**	0,011	1,000	0,4724	28,41	1
X_3	0,320	4,789***	0,000	1,000	0,4698	28,25	2
X_4	0,218	8,754***	0,000	1,000	0,3027	18,20	3
X_5	0,094	5,904**	0,014	1,000	0,1352	8,13	5
Dependent variable: Customer satisfaction							
Total observations		290					
F		45,384***					
R^2		0,761					
Adjusted R^2		0,682					
Durbin Watson		2,143					
*Note: *** Significance level <0.01, ** Significance level <0.05, * Significance level <0.10 (2-sided test)*							

Source: Calculated from survey data in 2023

The results of Table 6 show that the variance inflation factor (VIF) is less than 10, so the regression model does not have multicollinearity. The Durbin Watson coefficient (1< d= 2.134< 3) shows that the regression model does not have autocorrelation. In Table 6, with the significance level Sig.< 0.01 of the F test, it can be concluded that the regression model always exists with a confidence level of 99%. The statistical significance level column (Sig. column) in Table 6 shows that all variables from X_1 to X_5 have statistical significance level <0.05. Thus, all factors X_1 to X_5 have a significant influence on individual customer satisfaction with digital banking at 95% confidence level.

Result discussion

From the regression model results, the relationship between the dependent variable (Satisfaction) and 5 independent variables is shown in the following regression equation:

$$Y = 3,197 + 0,185X_1 + 0,324X_2 + 0,320X_3 + 0,218X_4 + 0,094X_5$$

The independent variables X_1, X_2, X_3, X_4, X_5 have a positive relationship with the dependent

variable Y. To determine the level of influence of the independent variables on the dependent variable based on the standardized regression coefficients. The standardized regression coefficients can be converted into percentages as shown in Table 6. The results of Table 6 show the order of importance of the variables affecting satisfaction as follows: The highest is X_2 "Reliability" (28,41%), X_3 "Responsiveness" (28,25%); followed by X_4 "Assurance" (18,20%); X_1 "Tangibility" (17%) and the lowest is X_5 "Empathy" (8,13%).

Through the tests, it can be confirmed that the factors affecting customer satisfaction with digital banking are respectively: (1) "Reliability", (2) "Responsiveness", (3) "Assurance", (4) "Tangibility", (5) "Empathy". Through EFA exploratory factor analysis, the SERVQUAL service quality scale when applied to digital banking quality shows that the components of digital banking service quality, including: "Reliability", "Responsiveness", "Assurance", "Tangibility", "Empathy", have a significant and positive impact on individual customer satisfaction, which is consistent with the comments of previous studies (Cronin & Taylor, 1992; Kotler & Keller, 2009). The regression model has an adjusted square correlation coefficient (Adjusted R^2 = 0,682) that explains 68,2% of the variation in the dependent variable, so it can be applied to the digital banking sector.

Conclusions: Conducting research on the elements that influence customer satisfaction with digital banking is essential for banks to enhance positive and significant factors while minimizing negative factors. This research will contribute to improving the overall quality of digital banking services. The objective of this study is to construct and evaluate a model that illustrates the correlation between several parameters that influence the satisfaction of individual consumers who utilize digital banking services provided by commercial banks in Vietnam. In order to accomplish the aforementioned research goal, the study conducted a survey of 290 customers who utilize digital banking services provided by commercial banks in Vietnam. A questionnaire was utilized to gather data, and an exploratory factor analysis model was employed to identify five primary factors that influence customer satisfaction with digital banking. These factors are as follows: (1) "Reliability", (2) "Responsiveness", (3) "Assurance", (4) "Tangibility", and (5) "Empathy". Considering the elements that have an impact, joint stock commercial banks in Vietnam can develop a plan to enhance digital banking in order to align with client expectations.

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MOTIVATIONS FOR ORGANIC RICE PURCHASE: THE CASE OF VIETNAMESE CONSUMERS

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Abstract: ***Green consumption has become the prominent topic in contemporary marketing. While developed countries have embraced the concept for decades, it is relative new in many developing countries. Hence, this study aims to explore green consumption with the case of organic rice in Vietnam, a developing country with significant population. 249 Vietnamese consumers were involved in the study with factor analysis and multiple regression specifications. The results indicated that affordability concerns have the most influence on the purchase decision, followed by health and packaging considerations. Based on these results, the study had enriched the organic consumption literature and had suggested implications for the stakeholders.***

• Keywords: *organic rice, purchasing decision, Vietnam, dual motivation theory.*

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1. Introduction

Making choices about purchasing organic food is a multifaceted process that involves numerous factors in decision-making. Studies indicate that demand for organic food is increasing due to the chemicals used in conventional production methods (Pati et al., 2016). While numerous papers on organic foods predominantly focus on consumers in the United States and Europe (Willer et al., 2021), there is a noticeable gap in understanding factors influencing consumers in other regions, such as Southeast Asia. In Vietnam, studies focused on general green product (Nguyen and Dekhili, 2019) or eco-certification and country of origin (Dekhili and Nguyen, 2021), but research on specific organic produce such as rice are limited. Hence, this study focused on exploring the factors impacting organic rice purchase with the setting of Vietnam, a developing country in Asia where the organic market is developing quickly (Willer et al., 2021).

Besides, an action performed by anyone is normally motivated by intrinsic and extrinsic motivations (Deci and Ryan, 1985). However, the exploitation of this dual motivation theory is not sufficiently explored in Vietnamese consumer's behavior. Most of the contemporary analyses of this theory in the context of Vietnam are for workforce motivations, rather than in the Marketing field with product consumption (Dang and Chou, 2020, PHAM, 2021). This is also another research gap that this study want to address, then answering the following research question:

How do intrinsic and extrinsic factors affecting organic rice purchasing decision of citizens in Vietnam?

By investigating 249 Vietnamese consumers with factor analysis and multiple regression specifications, the study would bridge these gaps and enrich the literature of organic consumption with empirical case of Vietnam.

2. Literature review

2.1. Dual motivation theory for a consumer behavior

Much of the works in the field of consumer's behavior relate to motivation, a construct that reflects all aspects of activation and intention (Ryan and Deci, 2000). Motivations can be classified into extrinsic and intrinsic ones when it comes to the self-determination decisions (Deci and Ryan, 1985). Extrinsic motivation refers to the *"performance of an activity in order to attain some separable outcome"*, which contrast to intrinsic motivation, a term that reflects *"an activity for the inherent satisfaction of the activity itself"* (Ryan and Deci, 2000). Following this dual motivation theory, this study examines both intrinsic and extrinsic motivations in the field of organic rice purchase decision.

2.2. Purchase decision of organic rice and its intrinsic motivation

The purchasing process resembles a specialized form of cost and benefit analysis (Mankiw, 2016).

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Consumers typically opt for what they perceive as the best product. Organic rice, as defined by Honkanen et al. (2006), is the food produced to a certain standard without the use of pesticides, herbicides, inorganic fertilizers, antibiotics, and growth hormones. Consequently, organic rice is often referred to as natural or healthy food.

In defining motivations for food consumption, Kovács et al. (2022) noticed that health benefit is a salient intrinsic motivation in the case of organic products. The health of organic food is identified by its nutritional value (Chrysochou et al., 2010). People tend to purchase organic food because of the family wellbeing (Ureña et al., 2008). Bagher et al. (2018) confirmed that health concern has a positive impact on the organic rice purchase decision. Hence, we propose the hypothesis H1 as follow:

***H1**: Health benefits positively affect on the organic rice purchasing decision.*

2.3. Extrinsic motivations: Affordability, Packaging, and Distribution

According to Taylor et al. (2018), factors that pull consumers to the consumption of a specific products are extrinsic motivational factors. These factors can be price, packaging (Mueller et al., 2001), and availability (Halfmann, 2021). If product prices are relatively higher than conventional products, consumers are less likely to purchase them (Kavaliauske and Ubartaite, 2014). However, in some cases, although the prices are high, customers still buy products if they still can afford for it (which we call as "affordability") because of the benefits. This logic was found in Sumarwan et al. (2013) when most consumers (71%) purchase organic rice despite rising prices. It has been mentioned that consumers are willing to pay high prices for the required attributes they are looking for (Hanis et al., 2012) if they can afford for it. Thus, the hypothesis H2 in this study is as follow:

***H2:** Affordability positively affects the organic rice purchasing decision.*

Packaging is essential delivering, protecting and wrapping the product. Producers (and/or sellers) also use it for promotional purposes (Keegan and Green, 2016). Thus, packaging serves as a tool of marketing communication to attract potential customers because it provides information about the product (Kotler and Keller, 2016). In the case of undecided consumers; the package becomes important in purchasing choice because it conveys information to the consumer during the decision-making time (Kotler and Keller, 2016, Keegan and Green, 2016). Therefore, the hypothesis H3 in this research is as follow:

***H3:** Packaging positively affects the organic rice purchasing decision.*

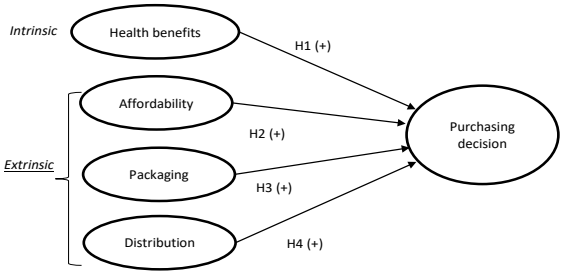
Distribution is an issue that the company must consider and has strategies to develop it. A distribution channel is a group of interdependent parties involved in delivering a product or service; they are ready to be used or consumed by consumers or businesses (Kotler and Keller, 2016). Timely distribution can enable consumers to make immediate purchasing decisions (Keegan and Green, 2016). Empirical research of Paul and Rana (2012) provides evidence that organic rice distribution significantly influences purchasing decisions with features of convenience, location and service delivery. Therefore, the hypothesis H4 is as follow:

***H4:** Distribution positively affects the organic rice purchasing decision.*

We are awared that consumer behaviors may change greatly depending individual characteristics such as age, income, education, etc. (Diamantopoulos et al., 2003), including the purchase decision of organic rice. Thus, we consider some characteristics of age, gender, education, and income in the study as control variables.

Based on the above-mentioned hypotheses, we propose the following conceptual framework:

Figure 1: Conceptual framework



3. Research methology

3.1. Sampling and Participants

The study utilized the snowball sampling technique with online questionnaires throughout Vietnam, mainly in Ho Chi Minh City and Ha Noi, from September to November 2022. We choose Ho Chi Minh City and Ha Noi as the main surveying location because Ha Noi is the political capital, and Ho Chi Minh City is the main economic hub of

Vietnam (Leducq and Scarwell, 2018). Therefore, consumers in these cities would reflect most of Vietnamese characteristics, from the North (Ha Noi) to the South (Ho Chi Minh), and from the politic to the economic focused viewpoint. From the original 75 consumers invited by the authors, the responses returned were 268, larger than the minimum sample suggested by Hair et al. (2010) (n≥ 28 observed variables x 5=140). However, only 249 responses were brought into the analysis due to the attention violation. Female was popular (53.4%), most of the sample were middle-age (30-39 years old comprised of 48.6%) and being employed (66.6%).

3.2. Procedure and Measurement

The survey was conducted via Google Forms' Online Survey system, then data was analysed with factor analysis and multiple regression. All the scales were inherited from the literature. *Health benefits* were measured by an eight-item scale of Lockie et al. (2002) and Fotopoulos and Krystallis (2002). For *affordability*, 5-item scale from Fotopoulos and Krystallis (2002) was used. Five items to examine the *Packaging* impact on purchase decisions on organic rice were employed from Dickieson et al. (2009). *Distribution* was measured with five items from Paul and Rana (2012). Finally, three items measuring the Purchase decision from Cheung and To (2019) were employed in this study. All items were measured on a 5-point Likert scale, ranging from "1 = Totally disagree" to "5=Totally agree".

4. Results

First of all, for the descriptive statistics, most items relating to independent variables received good judgments from consumers as the mean value normally greater than 3.5 (over the 5-point Likert scale). Only purchase decision items have mean values in the range of 2.9-3.5, suggesting a neutral opinion on the purchase decision.

4.1. Exploratory Factor Analysis (EFA)

To ensure the scales' reliability, Cronbach's Alpha values were checked before the EFA. All of the scales had good reliability with Cronbach's Alphas greater than .702, and none of the items has the corrected item-total correlation less than 0.3 (Nunnally and Bernstein, 1994). Hence, they were brought into the analysis with EFA.

After 3 times of running the EFA, 3 items were eliminated due to low loadings (<.5). The final EFA results is illustrated in Table 1. The KMO coefficient was .912 (>.5) and Bartlett's test was significant (p=.000) (Tabachnick and Fidell, 2013). Five factors were extracted and interpreted 50.186% of the total variance (Hair et al., 2010). Since items in each factor had changed, Cronbach's Alpha values were obtained again and the reliability of scales were greater than 7 (Table 1).

Table 1. Results of EFA

Factor and items	Loadings					Cronbach's alpha
Health benefits						.854
H1	.665					
H2	.650					
H6	.645					
H8	.629					
H3	.620					
H4	.614					
H5	.567					
Packaging						.860
P3		.694				
P4		.692				
P1		.671				
P2		.646				
P5		.567				
Affordability						.823
A1			.715			
A4			.696			
A2			.668			
A3			.577			
A5			.527			
Distribution						.759
D3				.744		
D4				.622		
D5				.533		
Purchase Decision						
PD2					.848	
PD3					.638	
PD1					.531	

Extraction Method: Principal Axis Factoring.

Rotation Method: Varimax

4.2. Multiple regression analysis

Scales were calculate the composite value before entering to the multiple regression analysis. With the $F_{(4,244)} = 4.858$, p=.001, the ANOVA result showed that the model was good fit with multiple regression analysis. Multicollinearity did not exist among independent variables since the VIF values were small - Table 2.

Table 2. Results of multiple regression analysis

Variables	Standardized Coefficients (β)	Collinearity Statistics (VIF)	Hypotheses
Health benefits	.163**	1.690	Confirm H1
Affordability	-.183**	1.044	Partly confirm H2
Packaging	.148**	1.785	Confirm H3
Distribution	.088	1.576	Reject H4
Gender	*.327***	1.028	
Age	*-.053*	1.548	
Education	*.095*	1.149	
Income	*-.047***	.822	

Notes: *** and **** indicate statistical significance at 5% and 1%, respectively.*

Table 2 revealed that Health benefits, Affordability, and Packaging had significant impacts on the purchasing decision of organic rice

in Vietnamese consumers. Both Health benefits and Packaging concerns have a positive impacts, leading to the confirmation for hypotheses H1 and H3. For Affordability, although it had a significant impact on the purchasing decision, this was a negative impact, not positive one as hypothesized, and led to a partially confirmation of H2. Surprisingly, the results rejected hypothesis H4 which meant that Distribution did not show a significant impact on purchasing decision. Additionally, women tend to buy more organic rice, and consumers with lower income have more inclination to purchase the organic rice.

5. Discussion

Among the factors, Affordability has the highest influence to the consumers purchasing decision. However, contrary to expectations, it has negative impacts rather than positive ones on purchasing decision of organic rice in Vietnam. 71% consumers in Sumarwan et al. (2013) study would continue to buy the organic rice despite rising prices. However, in Vietnamese context, things may a little bit different. The price of organic rice in the Vietnam market is quite high and is challenging to classes of consumers, thus they may cannot afford for organic rice (Vietnam, 2023). This is because the organic rice productivity is low, the growing and harvesting processes are strictly supervised to satisfy standards (Vietnam, 2023). However, consumers may still purchase it even though they cannot afford for it for long term. This finding is consistent with the assumption that the high price of organic rice make consumers consider it as a luxury products, and worth to try once if possible. The price of organic rice has higher about 10%-15% than the price of conventionally products (Thanh and Quan, 2023). Thus, this price may be still good enough to try as a luxury products, although they cannot afford it for long-term.

For the effects of Health benefits, this is the second substantial factor that impact the purchasing decision of organic rice of Vietnamese consumers. Prior studies argued that people tend to buy organic food since they pay attention to health from the healthier manufacturing processes (Sangkumchaliang and Huang, 2012), or higher nutritional (Sivathanu, 2015). The confirmation of a positive effect of Health benefits on Vietnamese consumers would also enrich the findings prior studies, and consolidate the importance of Health benefits of organic rice in Vietnam.

For packaging, Silayoi and Speece (2007) suggested that the packaging technique or material used can affect consumers' choice of organic rice. In packaging, it could be the structure, the designer (e.g. an empty designer to see the content of the product), the materials, or even the instructions (simple and easy) for the consumer's usage (Rettie and Brewer, 2000). Packaging also can build a contact channel between the consumers and business or creating the trust from consumers via certificate endorsement on the package (Keegan and Green, 2016). By supporting Hypothesis H3, this study also consolidate the role of packaging in convincing consumers to purchase organic products with a new context of Vietnam.

Surprisingly, distribution does not significantly affect the purchasing decision of organic rice in Vietnam, contrary to findings of Paul and Rana (2012). Paul and Rana (2012) contend that distribution attributes of convenience, good product location and delivery service significantly enhance the availability and market access, hence influence consumer purchasing decisions for organic rice. In Vietnam, however, a non-significant effect of distribution might come from many causes. Firstly, although organic rice has been introduced in the Vietnamese market for many years, consumers might still have low familiarity with it. Secondly, the outbreak of Covid-19 pandemic has shifted the shopping habit of consumers from traditional stores with huge distributional channel to online shopping without a specific stores (Hieu et al., 2021). Thus the role of distribution channel might be mitigated.

6. Conclusion

6.1. Academic and managerial contributions

Under the lights of dual motivation theory of Deci and Ryan (1985), the study has enriched such theory with an empirical study of organic rice purchase behavior within the context of Vietnam, a developing country. From the results, both intrinsic and extrinsic motivations are critical in Vietnamese organic rice consumption. In that, extrinsic motivations seem outweigh intrinsic one (affordability has the greatest impact). Secondly, a non-significant impact of distribution factor in this study also bring the extrinsic motivation (in terms of availability) effects into question. Hence, by portraying a negative effect of affordability, and a non-significant effect of distribution, the study has highlighted some venues for future researches,

especially in investigating the importance of affordability and distribution in purchasing organic rice, or broader, in purchasing organic products.

For managers, first of all, a negative impact of affordability on consumers' purchase intention might suggest that businesses can promote organic rice as a luxury products that people should try sometimes, even though they cannot afford for it in long term. Setting the price strategy that make consumers have the sense of excellent product might be an effective solution. Second, as health is an important factor affecting Vietnamese purchase decision, policymakers should disseminate more information on health benefits of organic rice to consumers in Vietnam. Organic rice cultivation should strictly avoid the use of pesticides, herbicides, fuel, or chemical fertilizer to maintain the organic rice quality. Lastly, for packaging, the R&D departments in firms are encouraged to develop bags using organic and high-preservation materials, and ensuring product traceability, for example via QR codes.

6.3. Limitations and future perspectives

While this study makes several valuable contributions, it is important to acknowledge its limitations, which necessitate further investigation. Specifically, the research scope is restricted as it solely conducted online surveys primarily in Ho Chi Minh City and Hanoi, lacking representation from other provinces in Vietnam. To address this, we recommend that future research expands its reach, focusing on a broader selection of provinces in Vietnam to clarify factors affecting consumers' decision to purchase organic rice. Secondly, shopping online is now popular in Vietnam, the focuses on offline distribution channels in this study may introduce possible biases. We propose that future research should be studied to turn the distribution channel into an online distribution suitable for the 4.0 technologies and globalization.

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ECONOMIC MOTIVATION AND OTHER DRIVERS OF CONSUMERS FOR PUBLIC TRANSPORTATION - METRO FORWARD CIRCULAR ECONOMY IN HA NOI

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Abstract: ***The article studies the economic efficiency of switching the transportation of a group of individuals (96 people) in Hanoi in March 2024 from existing means to public transport, Metro. The research calculates the economic efficiency of that transfer activity for individuals based on three factors: age, income, and distance travelled, and it finds out whether the factors influence these groups by One-way ANOVA Test. In addition, the study also found seven groups of factors that can significantly influence consumers' switching decisions and conducted an AHP Analytic Hierarchy Process (AHP) analysis to determine the main factors promoting their switching. The study results found several statistically significant differences, showing that distance will significantly impact economic efficiency. The study also supported the idea that economic benefits are not the leading factor in the switching decisions. From there, the study also made several related comments and recommendations.***

• Keywords: *circular economy, economic motivation, metro, public transportation.*

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1. Introduction

Circular Economy is a broad concept that addresses the problem of lack of input resources for modern society's activities and the problem of environmental harm caused by increasing waste sources. The most commonly mentioned solutions are reducing the consumption of precious resources and extending the life cycle of resources through recycling and reuse.

In the field of transportation, the circular economy demonstrates the perspective of saving resources in shifting to resource-saving means of transport, such as vehicles running on clean energy instead of traditional vehicles, designed Vehicles that are more resource-efficient than traditional vehicles, public vehicles.

Within the scope of the research article, the author will focus on the shift to public transportation, specifically Metro (Metro), a transportation activity that has been popular in developed countries over the years and has become the primary means of public transport in many countries. The pilot in the capital, Hanoi, with the Cat Linh - Ha Dong Metro railway, is one of the first projects towards that goal.

The study will evaluate the economic efficiency of the transfer for individuals transferring to Metro using the formula for calculating the difference in cost savings of the transfer. It will also analyze differences in age, income, and travel distance of research subjects and test One Way Anova to see the impact on economic efficiency based on three primary factors.

The research will also analyze seven psychological factors considered the main drivers for migration and determine which factors will influence migration the most through AHP testing.

Research hypotheses are built as follows:

H1: Age has an impact on cost savings

H2: Income has an impact on cost savings

H3: Distance has an impact on cost savings

H4: Economic motives are more influential than other motives in decision-making

The structure of the research article is as follows: Part 2 is the research overview, part 3 is the data and research methods, part 4 is the research results, and part 5 is the research recommendations and some limitations.

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2. Literature review

Each industry in the economy has its problems and characteristics that can develop towards a circular economy in different ways. Many researchers have sought to concretize the concept of CE to monitor, evaluate, and record different perspectives on CE in different industries, typically the 10 R scale given by Potting et al.. This scale is widely used as a criterion to concretize the concept of CE in different fields. For physical production, 3R and 4R are most widely applied and aim to extend the life cycle of materials through reducing, reusing and recycling.

However, in the service sector, the service itself does not have a physical form to carry out recycling, so the service sector towards CE will focus on other R aspects and especially R1: rethink.

Public transport can be buses, trains, submarines, sky trains, and trams, and with the technology in the world today, for urban areas, Metro trains, especially are considered a means of improving exploitation efficiency from the perspective of saving raw materials and protecting the environment the most

Many studies focus on the economic benefits of public transport users compared to before and find a proportional relationship, meaning that the more people use public transport, the more they save money.

However, the level of economic benefits that people save will depend on many factors. Studies suggest that young people have a good attitude toward public transportation. When young people move a lot, switching to public transport will reduce the total cost of travel to a great extent. From there, the benefits for young people outweigh those for middle-aged or older adults.

The income of people in urban areas may affect the level of savings benefits because people with different income levels will often choose work locations with different living environments. Low-income people in urban areas often stay far away from the working environment, so switching vehicles to public transport will save much money. High-income people often have high incomes enough to live near their workplaces, so the cost savings will not be as significant

Travel distance is considered a major influence on the transition to Metro. However, a long average commute can also be the route of people who have the purpose of moving continuously, meaning that the actual portion of this group's transfer to Metro is low compared to their actual travel distance and makes their cost savings not high.

Besides research on the sustainable motivation of the transition, in order for the transition to public transport to be highly sustainable, many people believe that the economic motivation of participants must be guaranteed. However, many people believe that other factors, such as avoiding traffic jams, providing comfort, and diminishing the problem of psychological inhibition caused by traffic jams in large cities, are more influential factors.

Some studies focus on environmental motivation, not personal issues, which are one's economy or personal comfort, dedication, social responsibility, and the environment as the factors in deciding to switch. Some studies mention another personal motivation: the motivation to affirm self-image through public transportation to demonstrate environmental responsibility, a derivative motive formed from a legitimate environmental motive. Besides, the psychology of following the crowd without a clear personal motive.

Another motivation discovered by some research is the benefit of travelling between the train station and the final destination, it gives an opportunity to do walking, which is good for health. Besides, for some people, public transportation makes them feel safer and reduces the possibility of collisions due to crowding on the road.

Interview participants

The author approached people waiting for the train and taking the train to conduct related interviews.

Interview contents

The interview content is divided into the following parts:

Part 1: Interview about basic information (age, income and travel distance

Part 2: Interview about cost savings when taking the Metro

Formula to calculate savings level:

$$SL = \frac{CT\ before - CT\ after}{CT\ Before}$$

Where: SL (Saving level): saving level; CT before = Cost of Transport before: Average cost of transportation for 1 month before switching to taking the train; CT after = Cost of Transport after: Average cost of transportation 1 month after switching to the train.

Specifically, the costs that can be mentioned are shown in the following table:

CT before = Cost of Transport before: Average travel cost for one month before switching to the sky train, including gasoline costs, repair and maintenance costs for personal vehicles, costs for taking a grab car, Cost of bus tickets and other related costs, if any.

CT after = Cost of Transport after: Average travel cost for one month before switching to the sky train, including buying train tickets (monthly or individual tickets), gasoline and maintenance costs for passengers. Besides, the travellers still have to use personal vehicles for other routes, which costs them common related costs. They also have to pay the cost of catching a car, buying bus tickets, and other related costs.

Part 3: Evaluation of economic motives compared to other motives when deciding to take a train

Participants were interviewed about pairwise comparison of motives according to the framework shown in the following table:

Table 1. Pairwise comparison

STT	Level	Compare pairs of importance levels	Explanatory content
1	1	Equal	This factor is as important as the other factor
2	3	Slightly	This factor is a bit more important than the other factor
3	5	Significantly more	One factor is significantly more important than the other
4	7	More	This factor is much more important than the other factor
5	9	Much more	This factor is much more important than the other factor

Source: Satty

Then, the results will be put into the pair matrix and calculated according to Satty's formula and only results with CI < 0.1 according to Satty's scale are valid.

Interview participants

Preliminary statistics about the subjects are shown in the following table

Table 2. Statistics of Metro riders

	Objects	Group	Numbers	Percentage
Age (AGE)	under 22 years old	1	27	28.13%
	22-25 years old	2	19	19.79%
	25-30 years old	3	22	22.92%
	Over 30 years old	4	28	29.17%
Income (INCOME)	Under 10 million/month	1	36	37.50%
	10-20 million	2	33	34.38%
	over 20 million	3	27	28.13%
Average distance travelled/day (DISTANCE)	< 10 km	1	23	23.96%
	from 10-15 km	2	28	29.17%
	from 15 - 20 km	3	20	20.83%
	> 20 km	4	25	26.04%

Source: compiled by the author

The distribution of characteristics among members of the sample is relatively even, implying that Metro participants are diverse and the sample meets the requirement of random.

4. Survey results

Results of research on economic savings of participants

Table 3. Statistical results on cost savings

No	Objects	Group	Average CT before	Average CT after	Average SL
Age (AGE)	under 22 years old	1	636.185	531.222	17.06%
	22-25 years old	2	614.947	502.211	19.23%
	25-30 years old	3	637.818	539.773	16.02%
	Over 30 years old	4	670.179	561.107	17.15%
Income (INCOME)	Under 10 million/month	1	685.08	574.72	16.99%
	10-20 million	2	614.85	514.64	17.04%
	over 20 million	3	618.70	511.04	17.95%
Average distance traveled/day (DISTANCE)	< 10 km	1	454.35	353.91	22.13%
	from 10-15 km	2	594.75	486.32	18.34%
	from 15 - 20 km	3	700.95	594.75	15.29%
	> 20 km	4	821.44	712.76	13.22%

Source: compiled by the author

The results indicate that the disparity in average expenses before and after, for each group reveals that the cost of daily transportation activities for the studied group constitutes around 10% of a typical Vietnamese labourer's wage (more than 7 million, according to the General Statistics Office, by February 2024). When switching to using Metro public transportation, they will reduce costs for using current vehicles, especially personal vehicles, and lose additional costs for taking the train, and the difference is the savings. Specifically, the additional costs for Metro are as follows: Metro train ticket price (according to statistics as of March 2024) is 9,000 - 24,000 VND/trip, and the 1-day ticket price is 48,000 VND. The 3-day ticket price is 108,000 VND. The monthly ticket price for

general passengers is 330,000 VND/month; for students, it is 165,000 VND/month. With that additional cost and cutting many costs related to previous travel, using Metro has saved about 15-20% compared to the average cost of the surveyed group.

Anova test results

After dividing the surveyed subjects into groups according to age, income, and distance criteria, the ANOVA test was used to evaluate the difference in cost savings. The results are shown in table 4.2-4.4 below:

The following tables show the One Way Anova test results for groups when divided by age (AGE), income (INCOME) and distance (DISTANCE).

Anova test results

Table 4. Anova test for pairwise comparisons when divided by age

Multiple Comparisons							
Dependent Variable: SL							
	(I) AGE	(J) AGE	Mean Difference (I-J)	Std. Error	Say.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	1	2	-2.1643%	1.5886%	.176	-5.319%	0.991%
		3	1.0415%	1.5237%	.496	-1.985%	4.068%
		4	-0.0890%	1.4309%	.951	-2.931%	2.753%
	2	1	2.1643%	1.5886%	.176	-0.991%	5.319%
		3	3.2058%	1.6615%	.057	-0.094%	6.506%
		4	2.0753%	1.5769%	.191	-1.056%	5.207%
	3	1	-1.0415%	1.5237%	.496	-4.068%	1.985%
		2	-3.2058%	1.6615%	.057	-6.506%	0.094%
		4	-1.1304%	1.5115%	.456	-4.132%	1.871%
	4	1	0.0890%	1.4309%	.951	-2.753%	2.931%
		2	-2.0753%	1.5769%	.191	-5.207%	1.056%
		3	1.1304%	1.5115%	.456	-1.871%	4.132%

Source: compiled by the author by SPSS

- In term of age, only groups 2 and 3 have a statistically significant difference with Sig < 0.05 when considering the savings when switching to Metro and group 2 is the group with greater value.

+ The group under 22 has a relatively unusual distribution of value among members of this group; the group 25-30 and the group over 30 years old have differences in the savings level of group members, resulting in not finding the typical behavior of these groups.

+ The 22-25-year-old group has the most similar savings levels, which is explained because the 22-25 group is considered the most potential customer group to benefit economically from this activity. This age group mostly starts school and is finding and settling into a new job. Given the characteristics of the capital, which is considered a potential place to develop a career, many young people are trying to stay in Hanoi to look for jobs, so the frequency of movement of groups 22-25 within Hanoi is relatively high, continuous and for many purposes. Besides, this age group is also more willing to walk than other ages to save money travelling between stations, making switching to Metro transport the most significant savings for this group compared to other groups equally and statistically significantly.

+ The remaining groups have uneven savings levels among group members due to differences in travel behavior, and different members' expense levels will lead to the savings levels of members.

Table 5. Anova test for pairwise comparisons when divided by income

Multiple Comparisons							
Dependent Variable: SL							
	(I) INCOME	(J) INCOME	Mean Difference (I-J)	Std. Error	Say.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	1	2	-0.0539%	1.2939%	.967	-2.623%	2.516%
		3	-0.9640%	1.3669%	.482	-3.678%	1.750%
	2	1	0.0539%	1.2939%	.967	-2.516%	2.623%
		3	-0.9101%	1.3933%	.515	-3.677%	1.857%
	3	1	0.9640%	1.3669%	.482	-1.750%	3.678%
		2	0.9101%	1.3933%	.515	-1.857%	3.677%

Source: compiled by the author by SPSS

When considering income, unlike the opinion that the lowest income group will save on transportation costs, the lowest income group habitually uses economical transportation methods (travelling by bus or walking), so switching to the Metro method stays the same as the cost savings of the group in the sample.

+ The group with an average income is a group with quite flexible moving behavior, and the movement of this group shows that the frequency of large and significant differences between group members should be the average value. The average does not reflect the group's behavior.

+ Groups with high incomes show that the experience of switching to Metro instead of the previous mode of travel comes from many reasons, such as convenience rather than economic purposes, so this shift does not create a significant.

Table 6. Anova test for pairwise comparisons when dividing by distance

Multiple Comparisons							
Dependent Variable: SL							
	(I) DISTANCE	(J) DISTANCE	Mean Difference (I-J)	Std. Error	Say.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	1	2	3.7925%*	1.1858%	.002	1.437%	6.148%
		3	6.8458%*	1.2883%	.000	4.287%	9.404%
		4	8.9120%*	1.2174%	.000	6.494%	11.330%
	2	1	-3.7925%*	1.1858%	.002	-6.148%	-1.437%
		3	3.0533%*	1.2336%	.015	0.603%	5.503%
		4	5.1195%*	1.1594%	.000	2.817%	7.422%
	3	1	-6.8458%*	1.2883%	.000	-9.404%	-4.287%
		2	-3.0533%*	1.2336%	.015	-5.503%	-0.603%
		4	2.0662%	1.2641%	.106	-0.444%	4.577%
	4	1	-8.9120%*	1.2174%	.000	-11.330%	-6.494%
		2	-5.1195%*	1.1594%	.000	-7.422%	-2.817%
		3	-2.0662%	1.2641%	.106	-4.577%	0.444%

**. The mean difference is significant at the 0.05 level.*

Source: compiled by the author by SPSS

- When considering average travel distance:

+ Only group 3 and group 4 have no statistically significant difference; that is, the cost for travel activities is the same for the group moving from 15-20km/day, and the group moving over 20km/day can be considered the most significant sample. However, compared to previous transportation methods, there are too many differences among the subjects in the sample, and a relatively large group of subjects already use public transportation such as buses, causing the reduction to be insignificant. In contrast, another group rides personal motorbikes (wasting gas and depreciation) or a combination of buses and motorbike taxis.

+ Long distances mean that individuals will have many routes to travel and make costs quite flexible and different between group 3 and group 4 members, making it difficult to create statistical differences between these two groups.

+ However, compared to the other two groups, group 1 is the group that makes the most difference because the amount of money this group has to pay is already the lowest compared to the other groups. Similarly, group 2 is where the travel distance is the most reasonable for a typical worker. Choosing to switch to Metro brings benefits in terms of cost savings. Costs are similar in Group 2 but lower than in Group 1. The reason is not due to higher cost savings but rather due to lower savings on expenditure.

Economic factors and other factors affect the decision to switch to Metro

Using the AHP method to evaluate the contribution of the factors, we obtain the following table of results:

Table 7. Research results on weighted contributions of factors

STT		Explain
1	Economic motive	Want to save on travel costs
2	Convenient engine	If you want to avoid traffic jams, avoid rain and wind, you can take the time to work
3	Motivation for the environment	Actively choose green and public means to protect the environment
4	Motive for self-affirmation	Using green and public means is recognized by society as an act of contribution to the community
5	Motivation to follow the crowd	There is no specific motive, but just follow the crowd because you think it should be that way
6	Movement engine	Secondary motivation arises from having to travel between stations
7	Safe engine	Do not directly control the vehicle, avoid collisions

Source: compiled by the author

After pairwise comparisons in the matrix, the criteria rankings are calculated according to the AHP method as shown in the following table:

Table 8. Research results on weighted contributions of factors

No	Criteria	Label	Weighted
1	Economic motive	DR1	0.309459
2	Convenient engine	DR2	0.341598
3	Motivation for the environment	DR3	0.111536
4	Motive for self-affirmation	DR4	0.113112
5	Motivation to follow the crowd	DR5	0.058347
6	Movement engine	DR6	0.035561
7	Safe engine	DR7	0.030387

Source: caculated by the author

Reliability coefficient CR = 0.07528 < 0.1 means that the survey data is reliable and in ranking order;

The group of factors for the environment, self-affirmation or following trends ranked second. The group of secondary benefits, such as fitness and ensuring travel safety, ranked last

The characteristics of travelling in large cities like the capital, Hanoi, consume a considerable amount of time due to traffic jams, chaotic traffic, noise and dust pollution, and the primary means of transportation are primarily motorbikes, bringing quite a tiring and stressful personal experience. Switching to Metro trains helps people escape many personal experience problems, making people more motivated to move. Besides, the current means of transportation are mainly motorbikes; some take the bus, which also costs

little per month, making the savings from taking the train not the primary motivation for travelling.

5. Some suggestions and limitations of the study

- Thus, the economic motive is not the most significant motive to motivate behavior, but it is still vital (ranked second) in choosing behavior.

The difference in economic benefits through assessing the proportion of costs saved is most clearly shown when divided by the distance travelled. If more routes with more Metro can be built, better meeting the movement needs of many people with different levels of mobility, it will increase participation and attract more people. Increase economic benefits more synchronously and effectively, ensuring that no matter how much mobility the travellers have, they can still participate in the system and gain significant benefits.

To develop railway routes, we can start by studying the schedules of groups of people who have the habit of travelling by public transport such as buses and grasp the proportions, schedules and distances of this group of people to optimize alternative Metro transportation for this group. At that time, buses will become more of a means of transit than a means of transporting, reducing pressure on the traffic system in large urban areas, limiting traffic congestion, and increasing all economic, societal and environmental efficiency.

- The age and income of the interviewed group show a rotation between young school graduates and middle-income groups; this can be considered the leading customer group in Hanoi, where the majority are renters and choose a flexible place to work and live. However, they are affected by the difference in rental prices in central and sparsely populated areas. They are affected by continuous job elimination (being laid off or proactively changing jobs). Therefore, this route may suit the needs of this group during this period but may serve other customers in the future, and the current customer group might change their living place, resulting in its use is no longer appropriate.

Therefore, to ensure the stability of the income source from a stable number of loyal customers, the most optimal solution is to increase the number of construction routes to meet the fluctuating needs of customer activities. However, in a short period, that is impossible. A temporary solution for the short term is to increase the retention of old customers through incentives and promotions and try to expand the new customer base; they can increase new customers by increasing vouchers/point reward cards for those working and studying along the existing railway routes.

- The motivation at the top of the list is this vehicles' convenience, such as space to rest while travelling, avoiding traffic jams, and saving time. These motivations are long-term values that the system should bring to customers.

It is necessary to specifically enhance additional utilities, which can be mentioned as derivative services (possibly through the form of a contractor or as a side business activity of the company) within the train compartment or may be related to the passenger waiting area.

One of the accompanying integrated values is that many places build convenience stores or fast-food services, adding motivation and surplus value to travel, saving customers' time and creating additional sources of income for suppliers.

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THE IMPACT OF SELF-CONGRUITY TO DESTINATION BRAND LOVE IN TOURISTS IN HO CHI MINH CITY

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Abstract: ***Through the survey of 468 residents and tourists in Ho Chi Minh City from April 4, 2023, to May 4, 2023, the article shows that ideal self-congruity, and ideal social self-congruity significantly affect the destination brand love. Furthermore, immersion mediates additionally the impact of actual self-congruity, and social self-congruity on the destination brand love.***

• Keywords: *self-congruity, destination brand love, tourists.*

JEL codes : L83, L84, Z32

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Introduction

Aftermath of the COVID-19 pandemic, the domestic tourism of Vietnam sector has emerged as an essential component in the overall recovery and expansion of the industry. The present study concerns the development of the Thieng Lieng community tourism product, which is the first tourism product in Ho Chi Minh City that leverages the Can Gio mangrove forest. Therefore, it is necessary to study the impact of self-congruity to destination brand love in tourists in Ho Chi Minh City and contribute to improving the Vietnamese national values.

Review of literature and research methology

Review of Literature

Research of Blumenthal and Jensen (2019) focuses on the involvement of consumers and investigates the emotional interactions that can occur with the experience space of a destination, both of which can impact the level of immersion of travelers in the destination. A data analysis reveals that the immersion process can be divided into three distinct stages: "involvement triggers", "involvement words" and "state of immersion". Each successive phase is associated with a participation rate that is substantially higher than the preceding one. According to the findings, there are three distinct levels of tourist involvement that must be met before one can fully immerse themselves in a destination's experience and develop feelings of affection for that location. This article provides novel insights into the nature of the immersion process that have both theoretical and practical implications for the management of tourist destinations and the design of the tourist experience at those destinations. The study found that factors such as sensory stimulation, social interaction, and cultural authenticity all contribute to the level of immersion that tourists experience. By understanding these factors, destination managers can better tailor their offerings to create more immersive experiences for visitors, leading to increased satisfaction and loyalty. Additionally, these findings can inform the development of marketing strategies that highlights the unique and immersive aspects of a destination to attract more visitors.

Using the theory of conservation of resources (COR), research of Jiang and Tu (2022) investigates how and when social interactions influence tourist immersion in a destination. The proposed research model, in which emotional attachment mediates the relationship between social interaction and tourists' immersive experiences, and extraversion moderates the association between social interaction and tourists' immersion. community service and emotional solidarity. The results indicate that social interaction has a direct effect on tourists' immersive experiences, and that emotional solidarity mediates this relationship. Moreover, extroversion significantly reduced the effect of sincere social interaction on solidarity, and this effect was more pronounced for travelers with high extroversion scores. Additionally, extroversion strengthens the indirect relationship between social interactions and travelers' immersive experiences, and again, this relationship is stronger for highly extroverted travelers.

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In the context of tourism destinations, research of Usakli et al. (2022) aims at clarifying the relationship between self-congruity, functional congruity, and the destination's attachment. For the purpose of analyzing the study model, the partial least squares structural equation modeling was developed. According to the findings, both destination private self-congruity and destination social self-congruity, as well as destination functional congruity, positively influenced destination attachment. Private self-congruity and social self- congruity have comparable effects on tourist attachment. That is, none has a greater or lesser effect on attachment to the destination than the others. This indicates that both private self-congruity and social self-congruity play an equal role in predicting traveler behavior. The results indicate that tourists who visit a destination that mirrors their own image are more likely to form an initial favorable opinion of the location. Moreover, they are also more likely to engage in positive word-of-mouth communication about the destination.

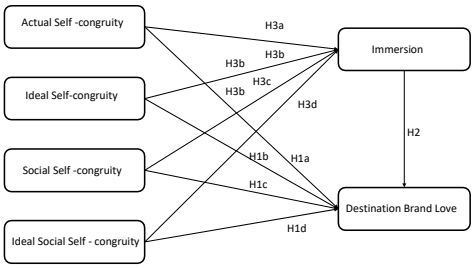
The resreach of Morando and Platania (2022) aims to investigate the determinants of luxury hotel selection while also analyzing the ability of hotels to promote their relevant destinations. The results of this study are in contrast with previous literature and indicate that potential tourists have formed a strong association with destination brands, proving that destination brand love is not only a bonding experience after the trip. These findings have provided important implications regarding symbolic consumption and emotional aspects of the luxury hotel experience. The predictors (Desire, Attitude toward Action, Subjective Norms and Customer Brand Identity) are confirmed as good antecedents for behavioral intention. Besides, destination brand love mediates the relationship between predictors, behavioral intentions, and loyalty. This study contributes to the limited literature on Destination Brand Love and provides a new perspective on the luxury hotel sector in Italy.

Research of Aro et al. (2018) is intended to conceptualize the antecedents and consequences of destination brand love. This study builds upon the academic articles on brand love, destination brands, and emotional relationships. The primary contribution of this study is the development of a premise-and-result framework for destination brand preference research. This framework offers researchers and experts new insights into the conceptualization of antecedents associated with brand experience, tourist dependence, and dependence on brands and systems. Effective system of emotions and behaviors for brand love as a destination. The results of the study provide an important insight into the extreme emotions associated with destinations and encourage further research in the field of novelty as it is currently studied. Furthermore, the study highlights the need for destinations to create unique and authentic experiences that foster emotional connections with tourists.

Proposed research model

The proposed research model is based on the theoretical foundation and concepts of self-congruity, immersion experience, and destination brand love synthesized from previous related studies.

Figure 1: Proposed research model and hypotheses



Source: Self-deprived by authors, 2023

Hypothesis

H1a: Actual self-congruity positively influences destination brand love.

H1b: Ideal self-congruity positively influences destination brand love.

H1c: Social self-congruity positively influences destination brand love.

H1d: Ideal social self-congruity positively influences destination brand love.

H2: Tourist' immersions positively influences destination brand love.

H3a: Actual self-congruity positively influences tourists' immersions.

H3b: Ideal self-congruity positively influences tourists' immersions.

H3c: Social self-congruity positively influences tourists' immersions.

H3d: Ideal social self-congruity positively influences tourists' immersions

Research methodology

During the period spanning from April 4, 2023 to May 4, 2023, a total of 500 questionnaires were distributed. Upon the completion of one month of data collection, a total of 468 responses were obtained, out of which 421 responses were deemed valid.

Result and discussion

Construct reliability

The research analysis of table 1 findings reveals

the value of Cronbach's alpha betweeen 0.8 and 1 is acceptable, 0.7 to 0.8 is relatively high. Convergence is measured using an indicator called AVE (Average Variance Extracted). The average deviation for each underlying construct in the model is represented by AVE. A level of 0.5 (50%) denotes an average independent variable that accounts for at least half of each observed sub variable's variability. Every AVE indicator is greater than 0.5. This outcome demonstrates that the scales have values of convergence for research concepts.

Table 1. Scale accuracy analysis

Scale development	Studied constructs	No of scale item	Cronbach's alpha	Composite Reliability (CR)	Average variance extracted (AVE)
Actual self-congruity	ASC	3	0.856	0.913	0.777
Ideal social self- congruity	ISC	3	0.899	0.937	0.832
Social self-congruity	SSC	3	0.920	0.923	0.799
Ideal social self-congruity	ISSC	3	0.875	0.949	0.862
Immersion	IMMER	3	0.863	0.916	0.785
Destination Brand love	DL	6	0.872	0.900	0.603

Source: Data from SmartPLS 3.0 software

Discriminant validity

The findings presented in Table 2 indicate that the bolded values along the diagonal of the table correspond to the square root of the Average Variance Extracted (AVE) for each variable (0.881; 0.777; 0.886; 0.912; 0.928; 0.894). Additionally, the values located below the diagonal represent the correlation coefficients between the independent variables. Thus, it can be concluded that the scale fulfils the discriminance.

Table 2. Result of the Fornell-Larcker criterion

Studied constructs	ASC	DL	IMMER	ISC	ISSC	SSC
ASC	**0.881**					
DL	0.372	**0.777**				
IMMER	0.579	0.430	**0.886**			
ISC	0.574	0.466	0.613	**0.912**		
ISSC	0.582	0.484	0.676	0.670	**0.928**	
SSC	0.568	0.426	0.600	0.675	0.643	**0.894**

Source: Data from SmartPLS 3.0 software

Evaluate the model-fit

Based on the original sample coefficients table 3, ideal social self-congruity (ISSC) has the most positive and significant impact on immersion (IMMER) with β = 0.359 (H3c), meaning the higher the ideal social self-congruity, the more immersion increases. Actual self-congruity (ASC) has a positive impact on immersion (IMMER) with β = 0.192 (H3a). Next is the ideal self-congruity (ISCimpact on immersion (IMMER) with β = 0.159 (H3b). Social self-congruity (SSC) has an impact on immersion (IMMER) with β = 0.153 (H3d).

Moreover, ideal social self-congruity (ISSC) has the most positive and significant impact on destination brand love (DL) with β = 0.224 (H1c). Ideal self- congruity (ISC) has the same direct effect on destination brand love (DL) with β =0.182 (H1b). Finally, the results showed at 90% reliability there was a relationship between immersion (IMMER) and destination brand love (DL) with β = 0.100 (H2).

On the other hand, at the 95% confidence interval, there are 2 rejected hypotheses: hypothesis H1a: actual self-congruity (ASC) (with p = 0.547 > 0.05) and hypothesis H1d: social self-congruity (SSC) (with p= 0.547 > 0.05). with p=0.172 > 0.05) for destination DL.

Table 3. Result of structural model's hypotheses testing

Hypothesis		Original Sample (O)	T-values	P-values	Result
H1a	ASC -> DL	0.034	0.627	0.547	**Reject**
H1b	ISC -> DL	0.182	2,862	0.005	**Support**
H1c	ISSC -> DL	0.224	3,611	0.000	**Support**
H1d	SSC -> DL	0.079	1,380	0.172	**Reject**
H2	IMMER -> DL	0.1	4,737	0.000	**Support**
H3a	ASC -> IMMER	0.192	3,941	0.003	**Support**
H3b	ISC -> IMMER	0.159	3,103	0.000	**Support**
H3c	ISSC -> IMMER	0.359	6,715	0.003	**Support**
H3d	SSC -> IMMER	0.153	3,228	0.072	**Support**

Source: Data from SmartPLS 3.0 software

Conclusion and implications

Conclusion of the research

After completing 1 month of data collection, 468 responses were received, with 421 valid responses, and data analysis was conducted. The study used SPSS and SmartPLS software to analyze data and test scales and hypotheses. The research has successfully accomplished its objective of examining the influence of self-congruity factors on tourists' immersion and brand love towards the destination in Ho Chi Minh City. The second objective is to ascertain the degree to which immersion influences tourists' affinity towards the destination brand in Ho Chi Minh City.

The findings indicate that the four types of self-congruity have a significant impact on immersion at a 95% confidence interval. Specifically, the ideal social self- congruity (ISSC) is the most influential predictor with a strong positive effect on immersive experience (IMMER) indicated by a β value of 0.359 (p-values = 000 < 0.05). The actual self-congruity (ASC) also has a positive impact on immersive experience (IMMER) with a β value of 0.192 (p-values = 0.000 < 0.05). The third factor that influences the immersion experience is the degree of congruence between the individual's ideal self and their actual self, also known as ideal self- congruity (ISC). The statistical analysis yielded a significant positive correlation between ISC and immersion experience, with a β coefficient of 0.159 and a p-value of 0.003, indicating that the relationship

is statistically significant at the 0.05 level. The study findings indicate that the construct of social self-congruity (SSC) has a significantly weak positive impact on immersive experience (IMMER), as evidenced by the β coefficient of 0.153 and a p-value of 0.003, which is below the accepted threshold of 0.05.

The findings indicate that two self-congruity factors have a distinct influence on the level of "destination brand love (DL)". Specifically, "ideal social self- congruity (ISSC)" exhibits a highly significant and positive impact on destination brand love (DL), with a β coefficient of 0.224 (p-values = 0.000 < 0.05). At a confidence interval of 95%, it can be concluded that the variable "ideal self- congruity (ISC)" has a significant positive impact on the level of affection towards the brand of the destination (DL), with a β coefficient of 0.182 and a p-value of 0.005, which is less than the significance level of 0.05.

The findings indicate a statistically significant association between immersion and destination brand love (DL) at a 90% confidence interval, as evidenced by a β coefficient of 0.100 for hypothesis H2 (p-values = 0.072 < 0.1).

Implications

The following author proposes some general management implications of resort designs at the destination to create a distinct image of the destination in the minds of tourists, in order to create compatibility between the destination and the guests. tourism as well as the immersive experience, the tourist's preference for the destination brand.

With respect to external factors, it is imperative for designers to create designs that align with the contextual features of the construction site as well as the economic and social entities involved. The contextual factors that are based on the type of housing, ideology, and materials utilised frequently serve as a reflection of the customs and traditions of the given location. The process of designing and planning a resort can involve the integration of various aspects, such as the characteristics of the location, the selection of materials, and the incorporation of design elements that align with the desired style and amenities of the resort. Furthermore, in the case of destinations that possess distinct regional cultural attributes, it is imperative for designers to consider how to effectively design such that visitors can experience the cultural nuances within a limited timeframe. Due to the distinguishing features of ethnic minority groups, tourism planning ought to be based on the preferences of the visitors, which entails conducting market research to ascertain the demographics of the guests, their requirements, and other pertinent factors. It is only through this process that products can possess distinct regional attributes while also catering to the demands of tourists.

With respect to environmental factors, environmental consideration is an essential component of resort development because of its impact on the site and the environment. Design should aim to conserve flora and fauna as much as possible and build with consideration, as there is a current trend of green consumption and wildlife protection. This is also a target aimed at tourists with characteristics such as vegetarianism, and animal protection. Furthermore, incorporating sustainable materials and renewable energy sources into the design can also attract environmentally conscious tourists and contribute to reducing the carbon footprint of the site. Additionally, creating educational opportunities for visitors to learn about the local ecosystem and ways to protect it can further promote eco-tourism and conservation efforts.

With respect to factors belongings to space, the configuration of the resort is a crucial factor in the comprehensive operation and triumph of the destination's blueprint. The proposed design ought to incorporate a spatial hierarchy that effectively differentiates between public, semi-public, and private spaces. The seamless transition from indoor to outdoor spaces is a crucial aspect that warrants attention. Spaces intended for public use must be designed to accommodate individuals of all ages, including those with disabilities who require specialised facilities. Besides, it is imperative for the design to take into account the cultural and social milieu of the region to guarantee that the constructed areas are pertinent and suitable for the populace. In addition, the integration of sustainable materials and practises within the design can effectively mitigate the ecological footprint of the area and foster a more salubrious milieu for its occupants.

With respect to aesthetic factors, the design of both the external destination and internal destination, the aesthetic appeal holds significant importance. The development of tourist destinations or resorts should prioritise the provision of opportunities for visitors to engage with natural environments and optimise their recreational experiences. In order to augment the inherent aesthetic appeal of the location, it is imperative that the edifice integrates harmoniously with its environment. The reduction of environmental impact can be achieved by utilising sustainable materials and implementing eco-friendly practises. The inclusion of outdoor pursuits such as hiking and water-based recreational activities can augment the

allure of a particular location for tourists in search of both excitement and repose.

With respect to designed landscape factors, tourist destination design depends on the landscape in large part because it is effective in creating an environment in and around the area. It also helps to develop the surrounding space and add greenery, which is often missing from the cityscape. The green areas in and around the building help to connect the indoor and outdoor spaces. Moreover, incorporating green spaces in urban areas has been shown to have numerous benefits such as improving air quality, reducing the urban heat island effect, and promoting physical and mental health. Therefore, it is important for architects and urban planners to prioritize the inclusion of green spaces in their designs.

With respect to hygience - health safety factors, Following the COVID-19 pandemic, there has been a notable increase in public concern regarding the safety and hygiene of various tourist attractions, entertainment venues, modes of transportation, and everyday commodities. Consequently, it is imperative to uphold and enhance the calibre of sanitation and security amenities in destinations frequented by tourists, particularly during times of intense rivalry within the tourism sector. In addition, it is imperative to enhance the amenities and technical infrastructure to guarantee a consistently pristine environment, thereby engendering a feeling of contentment among visiting tourists. It is imperative to disseminate and display cautionary notices at every tourist site, with the aim of sensitising visitors to uphold hygiene and safety standards. This includes observing proper dietary practises to prevent respiratory and foodborne illnesses, among other potential health hazards. It is imperative for the management departments of tourist destinations to exercise stringent control over the sourcing of ingredients for the preparation of dishes in restaurants and hotels and to ensure adherence to processing standards. In the event of a suspected infection, it is imperative to promptly address the situation while also upholding the confidentiality of clients. As per the World Tourism Organisation (UNWTO), it is projected that by 2030, the proportion of tourists travelling for the purposes of visiting, health, and religion will constitute 31% of the overall tourist population. Meanwhile, those travelling for sightseeing, convalescence, entertainment, and other leisurely pursuits will account for 54%, and those travelling for work and professional reasons will make up 15% of the total tourist population. However, in light of the recent pandemic, prospective travellers are expected to place greater emphasis on health-related criteria, potentially impacting the aforementioned 31% figure. Hence, it is recommended that travel companies integrate health care programmes or "body purification" services, such as skin care spas and hot spring chains for exfoliation, into their travel offerings. Providing adequate nourishment and consulting services for individuals can greatly enhance customer satisfaction and influence their travel decisions when engaging with the company. Furthermore, it is recommended that enterprises endorse the adoption of marketing tactics aimed at enticing visitors. The present scenario presents a favourable prospect for travel enterprises to advertise and augment the perception of the locale among vacationers. It is imperative for destinations located in epidemic areas to implement more robust and stringent measures, not only to accommodate domestic tourists but also to brace themselves for potential influxes of international tourists. Currently, amidst the global battle against the pandemic, Vietnam is widely regarded as a nation boasting some of the safest travel destinations worldwide. It is recommended that enterprises capitalise on the current situation to achieve significant advancements, thereby facilitating the swift recuperation of Vietnam's tourism sector. Overall, based on the examination and evaluation of various samples, the findings have demonstrated a widespread trend whereby contemporary tourists exhibit a heightened concern for matters pertaining to hygiene and safety. This phenomenon can be attributed to a shared rationale. The primary determinant is the COVID-19 pandemic. Hence, to revive the domestic tourism sector in Vietnam, it is imperative for enterprises to prioritise hygiene and safety concerns, curtail the spread of infections, and mitigate the associated risks. The aforementioned text pertains to the quality of service. For example, hotels and resorts in Vietnam can implement more frequent and rigorous cleaning procedures, provide hand sanitizers in public areas, and enforce social distancing measures to reassure guests of their safety. Additionally, tour operators can modify their itineraries to include outdoor activities that allow for more natural ventilation and space for physical distancing.

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INFLUENCE OF MEDICAL EXAMINATION AND TREATMENT'S SERVICE QUALITY ON OUTPATIENTS' SATISFACTION

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Abstract: ***In many organizations, especially those dealing with services, customer satisfaction is considered a challenge (Pula, 2022). The study is grounded in the previous studies on customer satisfaction and service quality. The purpose of this study is to examine the relationship between medical examination, treatment's service quality at Bach Mai Hospital, and outpatients' satisfaction. Between April and June 2023, the outpatients in Bach Mai Hospital will be surveyed. There were 327 respondents in the data collection, based on exploratory factor analysis, linear regression, and scale reliability analysis. According to the study, outpatients' satisfaction, medical examinations, and treatment's service quality at Bach Mai Hospital are positively correlated. The effects of the medical examination and treatment's service quality at the component level, however, vary. The findings of the study imply that outpatients should choose hospitals that provide high-quality services. There are some suggestions on how to enhance the caliber of their services and the growth of this industry in Vietnam. The study advances our knowledge of Bach Mai Hospital's levels of service quality.***

• Keywords: *outpatients' satisfaction, service quality, medical examination, treatment, business administration, Bach Mai Hospital.*

JEL codes: C52, L81, L83, F66, J01, O15

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1. Introduction

Medical personnel used to view patients as individuals who were requesting care and hoping for the doctor's goodwill. Bad things occur as a result of that awareness. If we continue to believe that the sick is the one requesting therapy, then there will still be a great deal of unfairness and even injustice.

If patients are perceived as customers, the behavior of not only doctors but also all medical staff must change. When understanding the needs and desires of patients, the hospital board of directors will have plans and solutions to improve quality and serve patients better.

As a complete special-class general hospital at the end of the country, Bach Mai Hospital's patient source is therefore abundant from all over the country. However, in Hanoi, there are also many good specialized public hospitals, such as K Hospital, Central Obstetrics Hospital, Hanoi Heart Hospital, Hanoi Kidney Hospital, etc., attracting many patients to visit. and treatment with professional quality and very good service. Faced with such high competition from surrounding hospitals, Bach Mai Hospital, which is a large public hospital with nearly 120 years of establishment and development, is considered a cumbersome machine and very difficult to change. But faced with the problem of how to retain not only customers but also high-quality medical staff working at the hospital, the only way to do that is to improve patient satisfaction. diseases, attracting many patients to come for examination and treatment, ensuring hospital revenue and medical staff income.

There are many factors that affect patient satisfaction, such as the attitude of medical staff, price, convenience, utilities, accompanying services, etc., during the medical examination and treatment process. Bach Mai Hospital is gradually making changes to best meet the wishes of patients, with the goal of providing treatment for 8,000-10,000 outpatient visits per day. This is a number that can be considered large for a public health facility, but with the determination of the hospital's board of directors as well as the consensus to change all officials and employees of Bach Mai Hospital, the goal will soon be achieved.

The objective of this study is to evaluate and measure the quality of medical examination and

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treatment services at Bach Mai Hospital and the impact of the quality of medical examination and treatment services at Bach Mai Hospital on patient satisfaction. From there, the study presents recommendations that help the hospital leadership have policies and solutions to improve service quality, increase patient satisfaction, and attract more and more people to the hospital for examinations and treatments, ensuring the hospital's revenue as well as the income of medical staff.

2. Literature review

2.1. Quality of medical examination and treatment services

We are aware that medical services are a unique category of services with unique requirements. There is still disagreement over the best way to quantify the quality of health services, and there is currently no agreed-upon definition of what constitutes high-quality health care. Still, there are a few very broad and widely accepted definitions of medical services:

Nguyen (2022) asserts that a high-quality medical service should satisfy the patient's needs while maximizing the provider's efficiency. The patient must always come first in quality medical care, and the environment in which patients receive and use care must be conducive to their ease of access and well-being. Appropriate treatment plans and methods, together with the knowledge patients need to comprehend their health. The most crucial thing about medical services is that they should prevent people from falling into poverty due to medical expenses and help patients recover their health under the finest possible medical examination and treatment settings.

2.2. Influence of medical examination and treatment's service quality on outpatients' satisfaction

Baxter (2004) used the SERVQUAL model to evaluate the quality of medical services in Nottingham and affirmed that the five components of the SERVQUAL model are the standard for measuring the quality of medical services. The study showed that patients' perceptions and expectations were not significantly different; however, the actual quality of medical services provided did not meet their expectations. The perceived importance of the five components of healthcare service quality is as follows: Reliability and assurance are considered the most important, followed by responsiveness and empathy, and lastly, tangibility.

Pham and Phung (2011) surveyed 457 outpatients at three hospitals in Ho Chi Minh City, including Nguyen Tri Phuong Hospital, Van Hanh General Hospital, and Medic Medical Diagnostic Center. The authors used the SERVQUAL model and developed seven factors that affect patient satisfaction, including hospital facilities and environment, operational capacity of medical staff, results of medical examination and treatment results, hospital service attention, medical examination and treatment time, reliability, and medical examination and treatment costs. The results show that there are 5 factors that affect the satisfaction of outpatients, of which 4 factors have a positive impact in order from strong to weak: (i) medical examination and treatment results; (ii) the working capacity of doctors and nurses; (iii) the hospital's facilities and environment; (iv) the hospital's attention to service; and (v) time for medical examination and treatment has a negative impact on outpatient satisfaction.

Mishra and Gupta (2014) affirmed that the attitude of the medical team is the most important factor affecting patient satisfaction. For doctors, it is a dedicated attitude when explaining to patients about the disease and treatment methods; for nurses, it is the attitude of welcoming and cooperating in treating patients. Besides, research also shows that "food quality," "environmental hygiene," "clinical quality," and "clarity of rules and regulations in the hospital" have a positive influence on patient satisfaction (Mishra and Gupta (2014).

Alghamdi (2014) used the SERVQUAL model with five components to evaluate the impact of medical service quality on patient satisfaction at government hospitals in southern Saudi Arabia. The author conducted the study from February 2013 to August 2013. The study sample consisted of 183 patients aged 18–61 years old. Research results show that the quality of medical services significantly affects patient satisfaction, with "empathy" having the greatest influence, followed by "tangibles" and "ability to respond," and finally "reliability" and "assurance.". Research also shows that when healthcare providers care for patients, especially when they are attentive and willing to help, patients feel more satisfied.

Nguyen (2022) uses the theoretical model SERVQUAL (Parasuraman et al., 1988) and the empirical model KQCAH including reliability, responsiveness and conformity, attention to attention and care, efficiency, and tangible means,

to evaluate the impact of medical service quality on patient satisfaction at public hospitals in Vietnam. Research results show that care and attention are the most important and decisive factors affecting patient satisfaction.

The theory of satisfaction suggests five components in the SERVQUAL model that are related to clients' satisfaction with service quality (Do et al., 2023).

Thus, the above studies all use the SERVQUAL model, which includes five components: reliability, assurance, responsiveness, empathy, and tangibles, which are components of medical service quality, to evaluate the quality of medical services that affect patient satisfaction. In the medical context, the components of the SERVQUAL model are explained as follows:

Reliability: The reliability of the patient or family member in the medical services provided by the medical facility;

Assurance: The results that patients expect to receive when participating in medical services;

Responsiveness: The technical facilities and professionalism of medical staff meet the needs of patients.

Empathy is the concern, care, and understanding from the medical staff towards the patient.

Tangibility: Is the infrastructure and equipment used in medical services? It also affects the clothing and appearance of medical staff.

3. Methodology

3.1. Research procedures and samples

To measure the impact of medical service quality on outpatient satisfaction with the quality of medical examination and treatment services at Bach Mai Hospital, we carry out a research process with the following steps: desk research, preliminary quantitative research, and formal quantitative research.

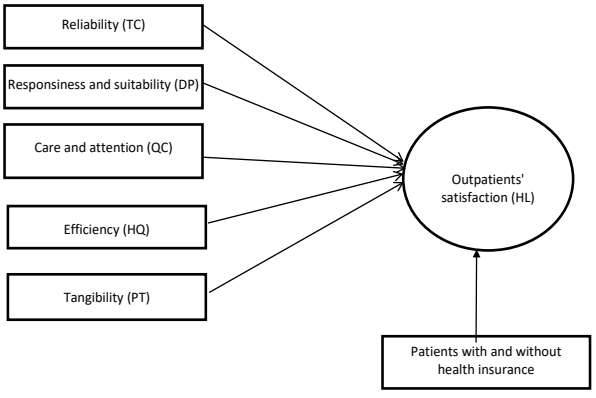
We conduct an overview of previous research works related to the research topic, find out in what aspects this topic has been studied, how to use research methods, what are the main results of the studies, and limitations of previous studies to determine the goals for further research. The results of this stage are to choose a research direction, clarify the components of medical examination and treatment service quality, and examine the influence of medical examination and treatment service quality on patient satisfaction when participating in medical examination and treatment. From there, build a research model.

Preliminary quantitative research was conducted with 100 outpatients visiting the Department of On-Demand Examination and Treatment at Bach Mai Hospital through the survey method. Collected data is used to evaluate the reliability of the scale before conducting official large-scale research.

Formal quantitative research was conducted with 350 outpatients coming to the Department of On-Demand Examination and Treatment, Bach Mai Hospital, through the survey method. We chose a non-probability sampling method called convenience sampling. However, to ensure the representativeness of the research sample, we selected sample units in different specialized clinics at the Department of Medical Examination and Treatment according to the requirements of Bach Mai Hospital, including ten (10) clinics. Specialties: Cardiology, Neurology, Gastroenterology, Musculoskeletal-JJoint, Dermatology, Endocrinology-DDiabetes, Respiratory, Tooth-JJaw - Facial, Ear-NNose-TThroat, Pediatrics. The research sample is satisfactory, ensuring structure and scale, according to Hair et al. (2014). According to Hair et al. (2014), for EFA exploratory factor analysis, the sample size must be at least five times the total number of observed variables in the scales. The questionnaire for this study includes 26 observed variables used in factor analysis. Therefore, the minimum sample size needed is 26 * 5 = 130 observations. In this study, there are 5 independent variables, so the minimum sample size is 26 + 8 * 5 = 66 observations. In this study, after cleaning, 327 surveys were eligible and included in the analysis.

3.2. Research model

Figure 1. Research model



Independent variables: (i) Reliability (TC) (includes four observed variables), (ii) Responsiness and suitability (DP) (includes four observed variables) (iii) Care and attention (QC) (includes five observed variables), (iv) Efficiency (HQ) (includes four observed variables), (v) Tangibility (PT) (includes five observed variables).

Dependent variable: Outpatients' satisfaction with the quality of medical examination and treatment services at Bach Mai Hospital includes four observed variables (Pham, 2024).

3.3. Data analysis

After being cleaned, the data is processed with the help of SPSS 21 software, including statistics, reliability testing through Cronbach's alpha coefficient analysis, EFA analysis, model regression, and comparison. Compare the difference in satisfaction between groups of patients with and without health insurance.

4. Research results

4.1. Cronbach' Alpha Analysis

Table 1 shows that all total correlation coefficients of each observed variable in each main scale are >0.3; the component Cronbach's alpha coefficients of the observed variables are all >0.7; and the total Cronbach's alpha of all main scales is >0.8, so the scales included in the study ensure reliability and can be included in factor analysis in EFA analysis (Hoang & Chu, 2008; Hair et al., 2009; Hair et al., 2014).

Table 1: Results of Cronbach's alpha analysis

Description	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Reliability (TC)			
TC1	.795	.859	.897
TC2	.757	.873	
TC3	.846	.840	
TC4	.697	.894	
Responsiness and suitability (DP)			
DP1	.663	.873	.878
DP2	.699	.859	
DP3	.785	.827	
DP4	.812	.814	
Care and attention (QC)			
QC1	.587	.803	.827
QC2	.540	.817	
QC3	.686	.774	
QC4	.663	.781	
QC5	.645	.787	
Efficiency (HQ)			
HQ1	.761	.863	.893
HQ2	.750	.867	
HQ3	.734	.873	
HQ4	.812	.843	
Tangibility (PT)			
PT1	.698	.884	.896
PT2	.731	.877	
PT3	.777	.866	
PT4	.795	.862	
PT5	.721	.879	
Outpatients'satisfaction (HL)			
HL1	.515	.812	.809
HL2	.600	.772	
HL3	.766	.695	
HL4	.640	.754	

Source: Prepared by the authors (2023) and SPSS software.

4.2. EFA analysis

The results of exploratory factor analysis with the scales of the independent variables are presented in detail in Tables 2 and 3. The specific measured values are as follows:

KMO coefficient = 0.776 (range from 0.5 to 1); the Barlett test has a significance level of < 0.001; Eigenvalue = 1.202 > 1; Total variance extracted: 71.702% > 50%; The loading factor of the lowest factors is 0.752 > 0.5;

Thus, the factor analysis method of the study is appropriate; with 22 observed variables included in the EFA analysis, 5 variables representing 5 main factors are extracted: Reliability (TC); responsiveness and suitability (DP); care and attention (QC); efficiency (HQ); tangibiliti (PT). These 5 forming factors represent 71.702% of the variance of the 22 observed variables. Besides, the loading coefficients of all factors are > 0.5, so new factors are created to ensure convergence and discrimination (Hoang & Chu, 2008; Hair et al., 2009; Hair et al., 2014).

Table 2. KMO and Bartlett's Test

No	Description		Value
1	**KMO**		0.776
2	**Bartlett's Test of Sphericity**	Approx. Chi-Square	4,368.870
		Df	231
		Sig.	<0.001
3	**Total Variance Explained**	Number of formation factors	5
		Eigenvalue	1.202
		Total % variance extracted	71.702

Source: Prepared by the authors (2023) and SPSS software.

Table 3: Rotation matrix results

	Component				
	1	2	3	4	5
PT4	.859				
PT3	.858				
PT2	.824				
PT5	.818				
PT1	.808				
TC3		.891			
TC1		.864			
TC2		.851			

	Component				
	1	2	3	4	5
TC4		.832			
HQ4			.912		
HQ2			.868		
HQ1			.843		
HQ3			.829		
QC3				.816	
QC5				.789	
QC4				.787	
QC1				.752	
QC2				.677	
DP4					.901
DP3					.888
DP2					.829
DP1					.802

Source: Prepared by the authors (2023) and SPSS software.

4.4. Model regression analysis

The results of the regression analysis presented in Table 4 show:

The R^2 coefficient value is 0.480. Thus, it can be concluded that the independent variables in the research model explain 48% of the variation in patient satisfaction.

F test results: F value = 60.865, sig value = 0.000. Thus, this relationship ensures reliability with an allowable level of 5%. Prove that the research model is consistent with reality. Therefore, it can be concluded that the independent variables have an impact on patient satisfaction, and the multiple linear regression model is suitable for the data set and can be used. Besides, the results of checking the multicollinearity phenomenon of the model show that the VIF coefficient of the independent variables is < 10. Thus, it can be concluded that there is no multicollinearity phenomenon in the model (Hoang & Chu, 2008; Hair et al., 2009; Hair et al., 2014).

The influence of medical service quality factors on patient satisfaction is determined through the standardized regression equation (Beta) as follows:

HL = 0.246 TC + 0.186 DP + 0.130QC + 0.279HQ + 0.197 PT

So, when current reliability increases (or decreases) by 1 standard deviation unit, patient satisfaction will increase (or decrease) by 0.246 standard deviation units.

When responsiveness and suitability increase (or decrease) by 1 standard deviation unit, patient satisfaction will increase (or decrease) by 0.186 standard deviation units.

When care and attention increase (or decrease) by 1 standard deviation unit, patient satisfaction will increase (or decrease) by 0.130 standard deviation units.

When effectiveness increases (or decreases) by 1 standard deviation unit, patient satisfaction will increase (or decrease) by 0.279 standard deviation units.

When tangibility increases (or decreases) by 1 standard deviation unit, patient satisfaction will increase (or decrease) by 0.197 standard deviation units.

Table 4: Results of regression analysis

	Beta
Reliability (TC)	**0.246**
Responsiness and suitability (DP)	0.186
Care and attention (QC)	0.130
Efficiency (HQ)	0.279
Tangibility (PT)	0.197
R^2	0.487
R^2 adjust	0.48
F	60.865
*N= 327, *p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001*	

Source: Prepared by the authors (2023) and SPSS software.

5. Discussion and implications

Research results show that changing the value of any of the five factors will change patient satisfaction. Thus, the hospital's Board of Directors can research and select factors suitable to their abilities and practical situation to positively change patient satisfaction.

Efficiency (HQ)

Efficiency positively affects patient satisfaction with a coefficient of 0.279; this is the factor that has the strongest influence on patient satisfaction with the quality of medical examination and treatment services at Bach Mai Hospital. Efficiency is the result that patients expect to receive when participating in medical services. To get this result, the patient must be diagnosed and given appropriate testing indications. Scales commonly used to measure this factor include: diagnostic results, medical examination results, level of recovery after treatment, etc.

Hospital leadership should create conditions for doctors, nurses, and technicians to regularly study and improve their skills to ensure their professional qualifications are always updated and meet the needs of examination and treatment of new diseases, as well as increased effectiveness for old diseases. This directly affects the quality of examination and treatment for patients.

Reliability (TC)

Reliability positively affects patient satisfaction, with a coefficient of 0.246. Reliability is the trust of patients or family members in the medical

examination and treatment services provided by the hospital.

Hospitals should ensure that all information about medical services is updated promptly, publicly, and accurately for patients through the hospital's website, fan page, and on the price list listed at the hospital. This creates trust as well as convenience for patients to check and compare prices when going to see a doctor.

Hospitals should thoroughly grasp "Say no to gifts and gifts" for all medical officers and staff. It is necessary to strictly handle cases that cause difficulties for patients and intentionally suggest receiving gifts. At the same time, raise the spirit of detecting medical officers and staff who have acted wrongly towards patients through distributing leaflets and advertising in the media and around the medical examination area at the hospital.

Tangibqility (PT)

Tangibility positively affects patient satisfaction, with a coefficient of 0.197. Tangible means are infrastructure and equipment used in medical services. In addition, it also affects the attire and appearance of medical staff.

Hospitals should upgrade and replace old equipment and machinery that no longer guarantee the accuracy of results.

Hospitals should arrange more televisions to broadcast entertainment programs in waiting areas to help patients and their families reduce stress caused by waiting. In addition, hospitals should also install high-speed, stable WiFi internet systems to serve patients. The wifi internet system is currently available, but only in some areas, and the connection quality is not stable.

Responsiness and suitability (DP)

Responsiveness and suitability positively affect patient satisfaction with a coefficient of 0.186. Responsiveness and suitability are the availability of medical services that can meet all patient needs quickly and promptly; suitability is the suitability of medical services to the needs of patients; this is expressed through technical facilities and the professionalism of medical staff to meet the needs of patients. The scales used to measure this factor include the behavioral attitudes of medical staff, hygiene, and infection control in physical and technical facilities.

The hospital should standardize its online consultation team, directly answer all patients' questions, and quickly and promptly notify patients of the information they need.

Faced with the current overload situation, hospitals should take measures to distribute patients, supplement human resources at hot spots, and set up a system for scheduling medical examinations or follow-up examinations in advance so that medical staff can proactively arrange appointments. Arrange clinic schedules for doctors.

Care and attention (QC)

Care and attention positively affect patient satisfaction, with a coefficient of 0.230. Attention and care are the degrees to which the patient receives attention, care, and understanding from the medical staff. Scales to measure this factor include: medical staff's behavior; the distinction between patients with and without health insurance; and how to receive and resolve complaints.

The hospital should regularly organize training classes on behavioral skills and medical ethics for hospital officials and employees. Through these training classes, medical staff will improve their awareness and behavior when communicating with patients and family members. Hospital leadership should have sanctions to deal with individuals and groups who harass, cause trouble, and have inappropriate attitudes toward patients and family members. At the same time, commend individuals and groups with achievements in medical examination and treatment or receive letters of praise from patients and family members to create motivation and a competitive environment in the hospital.

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FINANCIAL CONSTRAINTS AND R&D INVESTMENT: INTERNATIONAL EVIDENCE

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Abstract: ***This study examines the impact of financial constraints on research and development (R&D) investment by analyzing data from 19,988 non-financial global firms from 2009 to 2023, drawn from the Global Compustat database. The analysis utilizes multiple regression techniques, including Pooled OLS, fixed-effects (FEM), and random-effects (REM) models, to assess the robustness of the findings. The results indicate that financial constraints, as measured by the Whited-Wu Index (WW), have a significant negative effect on both R&D intensity (RDEI) and the natural logarithm of R&D expenditure (LNRDE). Specifically, higher financial constraints are associated with a reduction in R&D investments, suggesting that firms experiencing financial difficulties tend to cut back on R&D spending. Additionally, while firm size negatively affects RDEI, indicating that larger firms invest less in R&D relative to their size, it positively influences LNRDE, suggesting that these firms, despite lower R&D intensity relative to their size, have higher absolute R&D expenditures. The analysis also reveals that cash flow does not significantly impact RDEI but negatively affects LNRDE. These results underscore the critical role of financial constraints in shaping firms' R&D investment strategies and highlight the complex relationship between firm size, financial constraints, and R&D expenditures.***

• Keywords: *financial constraints; R&D investment; global firms; compustat*

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1. Introduction

Research and development (R&D) and innovation are difficult to finance due to market competition and constraints, which are driven by uncertainties in outcomes and asymmetric information between borrowers and lenders (Hall & Lerner, 2009). Investment decisions are influenced by both project evaluation and capital availability (Brown *et al.*, 2012), as R&D requires long-term investment before yielding results (Hall *et al.*, 1986). However, investors often prefer easily liquidated assets, making them hesitant to fund R&D (Stein, 2003; Alderson & Betker, 1996). This reluctance leads firms to scale back or abandon R&D projects in favor of lower-risk, quicker-return alternatives (Yang *et al.*, 2014).

As information asymmetry grows, companies become more reliant on internal cash flow for investment. The high risks of innovation create barriers to external financing, as firms hesitate to share information for fear of losing their competitive advantage (Aghion & Howitt, 1997).

Given these challenges, this study aims to investigate the impact of financial constraints on R&D investment. We analyze data from 19,988 non-financial firms over the period from 2009 to 2023. The paper is structured as follows: Section 1 introduces the research background and rationale for a global context. Section 2 reviews the literature and formulates the hypotheses. Section 3 details the research methodology and data. Section 4 presents the findings. Section 5 interprets the results, discusses limitations, suggests future research, and explores practical and theoretical implications.

2. Literature Review and hypothesis development

Corporate innovation, inherently risky (Liu *et al.*, 2017), increases cash flow uncertainty, impacting financial stability (Liu *et al.*, 2017). Cash flow stability is crucial for risk-taking and financing (Brown & Petersen, 2010). While some argue constraints stimulate innovation (Himmelberg & Petersen, 1994; Brown *et al.*, 2009), this study focuses on the negative impact of financial constraints on R&D investment.

These factors, including cash flow uncertainty and the critical need for stable cash flows to support risk-taking and innovation, underscore the significant impact of financial constraints on R&D investment (Tiwari *et al.*, 2008; Keefe & Tate, 2013; Boyle & Guthrie, 2003). Increased cash flow uncertainty leads to higher financing risks and reduced investment (Boyle & Guthrie, 2003). Information costs and cash flow dynamics also influence investment decisions (Hubbard, 1998).

Furthermore, innovation initiatives face significant financial constraints and uncertainty (Liu *et al.*, 2017),

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requiring substantial funding. This is particularly evident in the case of Chinese firms, which heavily rely on internal financing but face a "financing gap" that hinders innovation (Beladi *et al.*, 2021).

Based on the literature review, the following hypothesis is proposed:

H1. Financial constraints have a negative impact on R&D investment.

3. Research methodology

3.1. Model specification and variables

3.1.1. The regression model

Equation (1) is developed based on the literature review related to financial constraints and R&D investment as follows:

$$R\&D\ investment_{i,t} = \beta_0 + \beta_1 Financial\ constraints_{i,t} + \gamma Control_{i,t} + Year + \varepsilon_{i,t}\ (1)$$

Where: R&D investment$_{i,t}$ is the proxy of R&D investment for firm i in year t; The key independent variable, Financial constraints$_{i,t}$ represents financial structure for firm i in year t; β_0, β_1 captures the impact of financial constraints on R&D investment. Control refers to the set of control variables described in Table 1.

3.1.2. Independent variable

The author uses the Whited-Wu (WW) index to quantify the level of financial constraints, as proposed by Whited and Wu (2006). It combines various financial ratios and firm characteristics to assess the extent of a firm's financial constraints. To calculate the index, we use the following formula:

$$WW = 0.091 \times Cash\ Flow/Total\ Assets + 0.062 \times Long\text{-}term\ Debt/Total\ Assets - 0.021 \times Size + 0.044 \times Growth - 0.035 \times Capital\ Expenditure/Total\ Assets$$

Where:

Cash Flow/Total Assets: This term measures the firm's liquidity. A higher cash flow relative to total assets indicates better liquidity, which is associated with lower financial constraints. The coefficient of -0.091 implies that higher liquidity (cash flow relative to assets) reduces the financial constraint score, reflecting less financial pressure.

Long-term Debt/Total Assets: This ratio represents the firm's leverage. The positive coefficient of 0.062 suggests that greater leverage increases the WW index, indicating that higher levels of long-term debt are associated with higher financial constraints.

Size: This term is typically the natural logarithm of total assets. The coefficient of -0.021 indicates that larger firms tend to have fewer financial constraints. This is because larger firms usually have better access to financial resources and capital markets.

Growth: These variables measure the firm's growth opportunities. The positive coefficient of 0.044 suggests that firms with higher growth opportunities might face more financial constraints, potentially due to the increased need for funding to support growth.

Capital Expenditure/Total Assets: This ratio reflects the firm's investment in long-term assets. The negative coefficient of -0.035 indicates that higher capital expenditures relative to assets are associated with lower financial constraints, possibly because investment in assets can enhance future cash flows and reduce the firm's financial constraints.

3.1.3. Dependent variables

Table 1 describes all the variables included in the regressions as follows:

Table 1. Variable descriptions and descriptive statistics

Variable	Symbol	Description	References	Data source	Mean	Min	Max
I. Dependent variables							
R&D investment	RDEI	Research and Development expenditure/Total assets	Berchicci (2013), Usman et al. (2018)	Compustat	0.0396	0.0000309	0.4995
R&D investment	LNRDE	Natural logarithm of Research and Development expenditure	Giebel & Kraft (2024)	Compustat	3.759	-3.7297	11.0204
II. Independend variables							
Financial constraints	WWI	Whited-Wu Index as a proxy of financial constraints	Chen et al. (2021)	Compustat	-0.0814	-0.3302	5.2058
III. Control variables							
Firm size	Size	Natural logarithm of Total assets	Usman et al. (2018)	Compustat	7.5203	-0.0325	15.9441
Profitability	ROA	Net income/Total assets	Hutauruk, 2024	Compustat	0.0115	-1.2128	0.3453
Leverage	Lev	Total debt/Total assets	Gharbi et al. (2014)		0.5088	0.0063	2.5334
Tangible assets	Tangible	Property, plant, and equipment/Total assets	Zwaferink (2019)		0.2571	0	0.9044
Cash flow	Cash flow	Cash flow from operations	Wu et al. (2022)		-0.0168	-2.2334	1.1358

3.2. Sample and Methodology

The author uses data from the Global Compustat database via WRDS, covering 19,988 non-financial firms from 2009 to 2023. Financial institutions were excluded due to their distinct financial activities. To ensure dataset quality, missing observations were removed, and winsorization was applied to trim the top and bottom 1% of observations, minimizing outlier influence. The final dataset includes 132,626 firm-year observations. Panel data was analyzed starting with a Pooled OLS regression, followed by tests for multicollinearity (VIF), heteroscedasticity (White test), and autocorrelation (Wooldridge test). To verify robustness, fixed-effects (FEM) and random-effects (REM) models were used, along with diagnostic tests for model specification issues.

4. Results and discussions

4.1. Summary statistics

Table 1 presents descriptive statistics for the key variables in the study on financial constraints and R&D investment.

The mean R&D Expenditure Intensity (RDEI) is 0.0396, with a standard deviation of 0.0741, indicating that, on average, firms allocate a small portion of their resources to R&D, though there is considerable variability, with values ranging from nearly zero to 0.4995. The natural log of R&D Expenditure (LNRDE) has a mean of 3.759 and a standard deviation of 2.984, reflecting significant differences in R&D investment levels among firms, ranging from -3.7297 to 11.0204.

The Whited-Wu Index for financial constraints (WW) has a mean of -0.0814 and a high standard deviation of 0.5881, highlighting the wide variation in financial constraints experienced by firms, with values spanning from -0.3302 to 5.2058. Firm size, measured on a logarithmic scale, averages 7.5203 with a standard deviation of 3.3074, and ranges from -0.0325 to 15.9441, showing a broad spectrum of firm sizes.

Return on Assets (ROA) has an average value of 0.0115 and a standard deviation of 0.1958, indicating low average profitability but significant variation, with ROA values ranging from -1.2128 to 0.3453. The leverage ratio (Lev) averages 0.5088 with a standard deviation of 0.3592, demonstrating considerable variation in debt financing, from 0.0063 to 2.5334.

The proportion of tangible assets averages 0.2571 with a standard deviation of 0.2357, reflecting variability in asset composition, with values ranging from 0 to 0.9044. Finally, cash flow averages -0.0168 with a standard deviation of 0.3607, indicating slightly negative cash flow on average and a wide range from -2.2334 to 1.1358.

Table 2 displays the pairwise correlations among the variables analyzed.

Table 2. Pairwise correlations

Variables	RDEI	LNRDE	WW	Size	ROA	Lev	Tangible	Cash flow
RDEI	1.000							
LNRDE	0.010***	1.000						
WW	0.048***	-0.041***	1.000					
Size	-0.380***	0.801***	-0.044***	1.000				
ROA	-0.570***	0.170***	-0.035***	0.342***	1.000			
Lev	0.058***	-0.068***	0.022***	0.063***	-0.243***	1.000		
Tangible	-0.263***	0.092***	-0.008***	0.091***	0.056***	0.005***	1.000	
Cash flow	-0.310***	0.111***	-0.050***	0.161***	0.501***	-0.056***	0.005***	1.000

*Notes: This table reports the pairwise correlation coefficient matrix of the variable used in this study. ***, ** and * denote significant levels of 1, 5 and 10%, respectively*

The correlations are generally low, indicating minimal multicollinearity in the model. RDEI shows minimal correlations with other variables, suggesting its independence. LNRDE is strongly correlated with Size (0.801), indicating larger firms tend to have higher LNRDE, and weakly negatively correlated with ROA (-0.170). WW has low correlations with LNRDE (-0.041) and Size (-0.044), operating independently. Size is negatively correlated with ROA (-0.342) and positively with LNRDE (0.801), suggesting larger firms have lower ROA but higher LNRDE. ROA is positively correlated with Cash Flow (0.501). Lev shows weak correlations, with a slight negative relationship with ROA (-0.243). Tangible assets have weak positive correlations with LNRDE (0.092) and minimal links with other variables. Cash flow is positively correlated with ROA (0.501) and weakly with Size (0.161) and RDEI (-0.310). Overall, the correlations in Table 2 indicate weak to moderate relationships, confirming that multicollinearity is not a significant concern, allowing clearer interpretation of each variable's contribution.

4.2. Empirical results and discussions

Table 3 presents the results of the multivariate regression analysis examining the impact of financial constraints and various control variables on two measures of R&D investment: R&D intensity (RDEI) and the natural logarithm of R&D expenditure (LNRDE). The table also includes the results of tests for fixed and random effects models to determine the most appropriate estimation approach for the analysis.

Table 3. Analysis of multivariate regression results

VARIABLES	(1)	(2)	VIF
	RDEI	LNRDE	
WW	-0.001***	-0.021***	**1.01**
	(0.000)	(0.005)	
Size	-0.014***	0.782***	1.14
	(0.000)	(0.006)	
ROA	-0.106***	-0.740***	1.85
	(0.003)	(0.037)	
Lev	0.017***	0.057***	1.08
	(0.001)	(0.019)	
Tangible	-0.005***	0.249***	1.09
	(0.001)	(0.041)	
Cash flow	-0.001	-0.056***	1.70
	(0.001)	(0.013)	
Constant	-0.001***	-0.021***	
Mean VIF	(0.000)	(0.005)	**1.31**
R-squared	0.297	0.677	
Tests for fixed and random effects			
White's test			
Heteroskedasticity	25892.92 (0.000)	2134.44 (0.000)	
Skewness	5887.67 (0.000)	5147.53 (0.000)	
Kurtosis	911.31 (0.000)	837.43 (0.000)	
Wooldridge test			
	F(1, 15444) = 409.030	F(1, 15439) = 1794.894	
	Prob > F = 0.0000	Prob > F = 0.0000	
Hausman test			
	chi2(6) = 3963.95 Prob > chi2 = 0.0000	chi2(6) = -24120.41 Prob > chi2 = 0.0000	

*Notes: This table reports the baseline regression results of the impact of financial constraints and R&D investment. The firm fixed effect is included in the regressions. Standard errors are double-clustered by firm-year. Robust t-statistics are in parentheses. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.*

Table 3 shows that the Whited-Wu Index (WW) negatively impacts RDEI and LNRDE, indicating that financial constraints discourage R&D investment. A higher Whited-Wu Index (WW) score indicates greater financial constraints, and the negative coefficients (-0.001 for RDEI and -0.021 for LNRDE) suggest that as financial constraints intensify, firms reduce both R&D intensity and total R&D expenditure. This supports H1 and aligns with the pecking order theory (Myers & Majluf, 1984), which posits that firms prioritize internal financing and scale back R&D when internal funds are limited. R&D, being costly and risky, is often deprioritized during financial stress as firms focus on short-term survival. Whited and Wu (2006) support this, explaining that constrained firms often redirect resources from R&D to immediate financial needs. Furthermore, agency theory (Jensen & Meckling, 1976) suggests that managers may prioritize short-term financial stability over risky R&D investments, potentially leading to underinvestment in innovation.

Firm size exhibits opposing effects on R&D investment. The negative coefficient for size in the RDEI model (-0.014) suggests that larger firms have lower R&D intensity, likely due to their established market positions, aligning with Baysinger and Hoskisson (1990). However, the positive coefficient for LNRDE (0.782) indicates that larger firms still allocate substantial absolute amounts to R&D. This supports the resource-based view (Barney, 1991), suggesting that large firms possess the resources to fund significant R&D investments despite lower relative intensity.

Table 3 shows a negative relationship between return on assets (ROA) and both RDEI and LNRDE, suggesting that more profitable firms may invest less in R&D. This finding may be explained by a focus on short-term profitability over long-term innovation. This aligns with Jensen's (1986) free cash flow theory, which suggests that firms with high profitability and excess cash may prioritize shareholder returns (e.g., dividends, share buybacks) or other short-term investments over potentially risky R&D expenditures.

Table 3 shows a positive effect of leverage (Lev) on both RDEI and LNRDE, indicating that firms with higher debt levels tend to invest more in R&D. This finding appears to support the debt-overhang theory (Myers, 1977), which suggests that highly leveraged firms may be incentivized to pursue risky projects like R&D to generate returns for debt repayment. However, it also aligns with the argument by Aghion *et al.* (2004) that debt can incentivize innovation by creating a stronger incentive for firms to improve their financial performance.

Table 3 shows a negative relationship between tangible assets and RDEI, indicating that firms with more tangible assets tend to have lower R&D intensity. This supports Caves (1998), who suggests such firms may rely more on existing resources and established technologies for growth. However, the positive effect of tangible assets on LNRDE (0.249) suggests that firms with higher tangible assets still allocate substantial absolute amounts to R&D, likely due to their greater financial capacity to fund large-scale R&D projects.

Table 3 shows that cash flow has no significant impact on RDEI but negatively affects LNRDE. This suggests that while cash flow may not significantly influence the relative intensity of R&D, it can reduce the overall amount invested in R&D. This finding aligns with agency theory (Jensen & Meckling, 1976), which suggests that managers may prioritize projects that better align with their own interests, such as short-term profitability or empire-building, over potentially risky R&D investments, especially when excess cash is available.

For White's test of heteroskedasticity, both models (RDEI and LNRDE) show significant results with p-values of 0.000, indicating the presence of heteroskedasticity. The values for heteroskedasticity are 25,892.92 for RDEI and 2,134.44 for LNRDE, respectively. The test also highlights significant issues of skewness and kurtosis in both models, further confirming non-normality in the residuals.

The Wooldridge test for autocorrelation in panel data yields highly significant results for both models, with F-statistics of 409.030 for RDEI and 1,794.894 for LNRDE, both having p-values of 0.000. This indicates the presence of autocorrelation in the panel data.

The Hausman test is used to determine whether the fixed effects model or the random effects model is more appropriate. For both RDEI and LNRDE, the chi-squared statistics are highly significant with p-values of 0.000 (chi2(6) = 3,963.95 for RDEI and chi2(6) = -24,120.41 for LNRDE). This suggests that the fixed effects model is preferred over the random effects model, as it better accounts for the unobserved heterogeneity in the data.

In Table 3, these tests confirm that heteroskedasticity, autocorrelation, and model specification issues exist, and the fixed effects model is the more suitable approach for analyzing the relationship between financial constraints and R&D investment in this study. These issues will be addressed by implementing FEM robust, as shown in the results of Table 4.

4.3. Sensitivity tests

Table 4. Alternative analysis regressions

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	FEM		REM		FEM Robust	
	RDEI	LNRDE	RDEI	LNRDE	RDEI	LNRDE
WW	-0.001***	-0.021***	0.000	-0.015***	-0.001***	-0.021***
	(0.000)	(0.004)	(0.000)	(0.004)	(0.000)	(0.005)
Size	-0.014***	0.782***	-0.008***	0.805***	-0.014***	0.782***
	(0.000)	(0.004)	(0.000)	(0.003)	(0.000)	(0.009)
ROA	-0.106***	-0.740***	-0.117***	-0.931***	-0.106***	-0.740***
	(0.001)	(0.028)	(0.001)	(0.027)	(0.005)	(0.046)
Lev	0.017***	0.057***	0.015***	-0.022	0.017***	0.057**
	(0.001)	(0.015)	(0.001)	(0.014)	(0.002)	(0.026)
Tangible	-0.005***	0.249***	-0.014***	-0.176***	-0.005***	0.249***
	(0.001)	(0.031)	(0.001)	(0.028)	(0.002)	(0.061)
Cash flow	-0.001***	-0.056***	-0.000	-0.038***	-0.001	-0.056***
	(0.000)	(0.009)	(0.000)	(0.009)	(0.001)	(0.015)
Constant	0.145***	-2.763***	0.100***	-3.013***	0.145***	-2.763***
	(0.001)	(0.038)	(0.001)	(0.029)	(0.004)	(0.085)
Observations	132,626	132,588	132,626	132,588	132,626	132,588
R-squared	0.191	0.242			0.191	0.242
Number of firmid	19,988	19,983	19,988	19,983	19,988	19,983

*Notes: This table reports the regression results of the baseline model (Equation (1) to (2)) using alternative analysis regressions. Robust t-statistics are reported in parentheses. *, **, and *** denote statistical significance of 10, 5, and 1% levels, respectively.*

Table 4 confirms the robustness of our findings. Across Fixed Effects Model (FEM), Random Effects Model (REM), and FEM with robust standard errors, the negative impact of financial constraints, measured by the Whited-Wu Index (WW), on both R&D intensity (RDEI) and R&D expenditure (LNRDE) remains consistent. This consistency across models suggests that the observed relationship between financial constraints and R&D investment is robust.

5. Conclusions and implications

This study examines the impact of financial constraints on R&D investment using data from 19,988 global non-financial firms. The results show that financial constraints, measured by the Whited-Wu Index (WW), negatively affect both R&D intensity (RDEI) and total R&D expenditure (LNRDE). Increased financial constraints lead to reduced R&D investments, supporting the pecking order theory, which suggests firms with limited internal financing prioritize other needs over R&D.

Larger firms exhibit lower R&D intensity relative to their size but allocate significant amounts to R&D in absolute terms. This suggests that, despite lower relative spending, larger firms continue substantial R&D efforts to maintain their competitive edge. Additionally, cash flow does not significantly impact RDEI but negatively affects LNRDE, indicating that cash flow influences total R&D spending but not its intensity.

These findings have important implications for both academic research and practical management. Policymakers and managers should recognize that financial constraints can hinder R&D, potentially affecting innovation and long-term growth. Firms facing financial difficulties may need alternative financing or strategic adjustments to sustain R&D efforts. Future research could further explore the interactions between financial constraints, cash flow, and R&D investment, as well as other factors influencing R&D decisions across different industries.

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RESEARCH ON THE IMPACT OF IN-STORE LOGISTICS ON REPURCHASE INTENTIONS OF CONSUMERS IN HANOI

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Abstract: ***In-store logistics is considered an activity that reflects the overall quality of the logistics system within a business, while also directly impacting consumer satisfaction, which in turn leads to purchasing behavior and repurchases. This affirms that focusing on efforts to effectively implement in-store logistics plays a crucial role in meeting customer needs while ensuring the operational efficiency of the business. The objective of this study is to examine the impact of in-store logistics, including "product", "shelf management", and "return", on "repurchase intention" in supermarkets in Hanoi, through the mediating role of "customer satisfaction". Based on this, the article aims to provide suggestions for retail managers to properly focus on in-store logistics, minimize potential negative impacts, and turn them into driving forces for an effective retail experience.***

• Keywords: *retail, in-store logistics, satisfaction, repurchase intention.*

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1. Introduction

In-store logistics - including processes that start with receiving goods at the retail store, storing the goods, preparing the products, serving customers, and concluding when the products are delivered at the checkout counter - can directly provide value to customers. However, there are currently few studies focusing on in-store logistics, especially from the customer's perspective, despite its potential to help retailers differentiate customer experiences and create competitive advantages.

Based on a review of related literature and theories, this study aims to investigate the role of in-store logistics in customer satisfaction, which then leads to repurchase intentions, with a particular focus on the customer as the end consumer. The study is built on the S-O-R model, which asserts that distinct attributes of external environmental factors (Stimulus - S) influence the internal state (Organism - O) of the consumer, driving them to respond with behavior (Response - R) (Zhai et al., 2019). Accordingly, the results of the "in-store logistics" serve as external stimuli (S); based on these stimuli, customers form an internal emotional state - that is, "Satisfaction" (O). "Repurchase intention" represents the customer's response (R) after being satisfied with the outcomes of in-store logistics. Therefore, the proposed research model in this study will focus on evaluating the impact of in-store logistics on consumer repurchase intention, with customer satisfaction acting as a mediator. The research findings aim to provide suggestions for retail managers on how to properly focus on in-store logistics, minimize potential negative impacts, and turn them into driving forces for an effective retail experience.

2. Theoretical framework and research model

2.1. In-store Logistics

According to Bouzaabia et al. (2013), Ltifi and Gharbi (2015), and Najib & Saefuloh (2021), in-store logistics reflects a retailer's ability to satisfy customers by ensuring factors such as Product accessibility, Product information, Shelf stock-out, Shopping aids and Return. According to Moussaoui et al. (2022) and Garrouche et al. (2011), inherent logistics factors such as product accessibility, ease of product search, long product shelf life, full shelves, and complete information about product characteristics can positively influence overall customer satisfaction. On the other hand, customers tend to respond negatively when encountering issues during the shopping process, such as products with near expiration dates, long wait times at checkout, etc. These issues prevent customers from receiving the promised service and lead to dissatisfaction. Therefore, according to the authors, customers' perceptions of in-store logistics outcomes are reflected in three key aspects: Products availability, Shelf Management, and Convenience in checkout.

Based on the aforementioned theories, this study identifies three fundamental factors reflecting the outcomes of in-store logistics: Products (ensuring

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diversity, accessibility, and providing complete product information), Shelf Management (ensuring product availability by frequently updating stock levels and restocking items in a timely manner), and Return (ensure customers can easily and conveniently return or exchange products).

2.2. Repurchase Intention

Hellier et al. (2003) define repurchase intention as a personal decision made after evaluating previous purchase transactions, with the intention of repurchasing the same service or from the same provider based on considerations and possible situations. Repurchase intention is a positive evaluation of previous activities that leads to the intention of repurchasing. Hawkins & Mothersbaugh (2010) suggest that individuals driven by this intention are willing to repurchase to meet their needs, leading to increased purchasing behavior, which creates commitment to reuse the service or brand loyalty.

Repurchase intention can be realized by establishing and managing customer relationships through adjusting organizational services and continuously providing value and enhancing customer satisfaction. Therefore, in aiming to foster repurchase intention, companies should not only focus on simple repurchases through promotional activities but also try to elicit customer commitment and a positive attitude toward the companies. By creating a comfortable shopping environment, retailers can stimulate customers to spend more, which in turn increases the quantity of products sold. It also encourages customers to stay longer in the store and explore other products on display, all of which contribute to stimulating reppurchase intentions (Turley & Milliman, 2000).

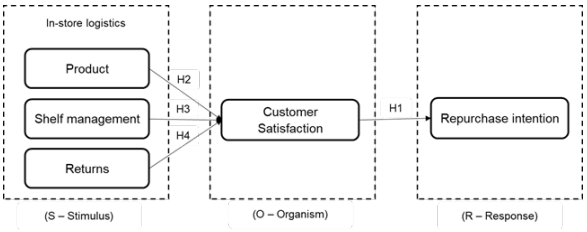
2.3. Research Model

The SOR model, proposed by Mehrabian and Russell in 1974, asserts that certain external aspects can serve as stimuli (Stimulus - S) that affect the internal state of the subject (Organism - O), leading to a specific behavioral response (Response - R) (Zhai et al., 2019). This model suggests that external stimuli do not directly influence behavior but follow an indirect path where external stimuli affect the internal state of the subject, leading to their final behavioral outcome.

The SOR model is widely accepted and used in many studies, especially those on consumer behavior in retail contexts (Chang et al., 2011). Nguyen Quyet Thang & Pham Phuong Thao (2022) argue that the shopping environment, which contains stimuli (S), is the agent that causes changes to the internal state of the subject (O), leading to either an approach or avoidance response (R) toward the store or behaviors such as store searching and purchase intentions (including repurchase intentions).

Based on the SOR model, in this study, the result of "in-store logistics" are reflected through three aspects: Products, Shelf Management, and Return, which serve as external stimuli (S). Based on these stimuli, customers will form an internal emotional state - "satisfaction" (O). "Repurchase intention" represents the customers' response (R) after being satisfied with the outcomes of in-store logistics. Therefore, this study employs the SOR model to develop a research model including five factors: Products, Shelf Management, Return, Customer Satisfaction, and Repurchase Intention. The study focuses on exploring the relationships between Products, Shelf Management, and Return and their impact on Customer Satisfaction, as well as the relationship between Customer Satisfaction and Repurchase Intention (Figure 1).

Figure 1. Research model



Source: by Author

2.4. Research Hypotheses

Satisfaction and Repurchase Intention

In recent years, repurchase intention has garnered significant attention from researchers. Various studies across different industries, such as retail, food delivery, mobile e-book applications, e-commerce, and smart tourism, have shown that customer satisfaction influences repurchase intention (Lin et al., 2023). Chatzoglou et al. (2022) also emphasize that customer satisfaction is directly connected to their intention to repurchase. Customer satisfaction (post-purchase) plays a significant role in shaping the intention to purchase again. Satisfaction refers to customers' emotional response when evaluating their experiences during the consumption of a product or service. It represents how customers feel after comparing the actual performance (or result) they experience with their expectations. Customer satisfaction is one of the primary objectives companies should focus on to maintain long-term relationships with customers because it is a key driver of sustainable business development and affects customers' repurchase intention (Chatzoglou et al., 2022). Therefore, the research hypothesis is proposed:

H1: Satisfaction has a direct and positive effect on customers' repurchase intention

In-store Logistics and Satisfaction

As previously discussed, the results of in-store logistics reflect a retailer's ability to satisfy customers based on three factors: Products, Shelf Management, and Return.

Products: The product factor is reflected in ensuring diversity, accessibility, and providing comprehensive product information. According to Moussaoui et al. (2022), Garrouche et al. (2011), meeting product requirements is an essential aspect of ensuring customer satisfaction. Product variety plays a critical role in creating customer satisfaction in retail. Morales et al. (2013) state that consumer decisions are positively related to product diversity, while Marques et al. (2013) conclude that product variety is the most significant factor influencing customer satisfaction. Additionally, the product information provided by the retailer influences how customers perceive the retail service. With sufficient information, customers can make better purchasing decisions, creating value for them and enhancing their satisfaction (Mentzer et al., 1989). Therefore, the research hypothesis is proposed:

H2: Customers' perceptions of the product factor have a direct and positive effect on customer satisfaction

Shelf Management: Shelf management involves timely restocking of products without obstructing customers' access to other products. Products must be available for customers to assess and decide whether to purchase. Stockouts or the unavailability of products on shelves (even though they may be available in the retailer's warehouse) are signs of ineffective in-store logistics (Mentzer et al., 1989). Various negative consequences of stockouts have been reported, such as the impact on store image, customer satisfaction, loyalty, and even the store's profitability. Stockouts on retail shelves often degrade the customer experience (Moussaoui et al., 2022; Garrouche et al., 2011). Therefore, the research hypothesis is proposed:

H3: Customers' perceptions of shelf management have a direct and positive effect on customer satisfaction

Returns: According to Dabholkar et al. (1996), Bouzaabia et al. (2013), Karl et al. (2022), customers' concerns about returns (returnable goods or packaging that can be returned to the retailer) can influence customer satisfaction and their future shopping destination choices. Customers expect a dedicated service desk to handle defective products or returns, with clean and accessible return containers. Therefore, the research hypothesis is proposed:

H4: Customers' perceptions of return have a direct and positive effect on customer satisfaction

3. Research methodology

3.1. Measures

The measurement scales in this study were derived from previous research to select the most appropriate scales for 3 independent variables (Products, Shelf Management, and Return), 1 mediating variable (Customer Satisfaction), and 1 dependent variable (Repurchase Intention), as shown in Table 1. The variable "Product" consists of 6 scales inherited from the study of Garrouche et al. (2011) and 1 scale from Moussaoui et al. (2022). The variable "Shelf Management" includes 4 scales from Garrouche et al. (2011). The variable "Return" includes 2 scales from Bouzaabia et al. (2013) and 1 scale from Karl et al. (2022). The variable "Customer Satisfaction" has 4 scales from Chatzoglou et al. (2022) and 2 scales from Moussaoui (2022). The variable "Repurchase Intention" contains 4 scales from Chatzoglou et al. (2022). The scales were translated from English to Vietnamese, followed by back-translation to ensure accuracy (Giao & Vương, 2019).

Table 1. Variables of the research model

Variables	Code	Sources	Number of items
Product	P	Garrouche et al. (2011), Moussaoui et al. (2022)	7
Shelf Management	S	Garrouche et al. (2011)	4
Return	R	Bouzaabia et al. (2013), Karl et al. (2022)	3
Customer Satisfaction	CS	Chatzoglou et al. (2022), Moussaoui et al. (2022)	6
Repurchase Intention	RI	Chatzoglou et al. (2022)	4

Source: by Author

3.2. Data Collection Method

According to data from the Hanoi Department of Industry and Trade, there are 135 supermarkets operating in Hanoi in 2023. These supermarkets, with diverse product offerings and modern shopping environments, provide a new shopping experience for customers, which also requires unique logistics management, particularly in-store logistics. Due to research limitations, this study focuses on understanding the impact of in-store logistics on repurchase intention among customers of retail supermarkets in Hanoi. This is also the target group for the survey.

The survey questionnaire consists of two main parts: Part 1 includes 5 questions to gather demographic information about the respondents. Part 2 contains 24 questions to collect customer evaluations of the impact of in-store logistics on their repurchase intention. The questions are structured as closed-ended, using a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

For the sample size, the research uses Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess the measurement and structural models.

This method does not require data to follow a normal distribution and can be used with smaller sample sizes. A sample size of 100-200 is sufficient for PLS-SEM analysis (Giao & Vương, 2019). As a complete list of customers from retail supermarkets in Hanoi was not available, a non-probability convenience sampling technique was applied to collect the research sample. Surveys were conducted both online (via google forms) and offline (paper surveys distributed to customers in supermarkets). After two months of surveying (9, 10/2024), a total of 347 responses were collected. After reviewing and excluding 15 invalid responses, 332 valid responses were retained. This sample size meets the minimum requirement for ensuring the reliability of the analysis results.

Characteristics of the Sample: *Gender:* 120 male (36.14%) and 212 female (63.86%); *Age:* 136 (40.97%): 1997 - 2012, 98 (29.52%): 1981 - 1996, 69 (20.78%): 1965 - 1980, and 29 (8.73%): 1946 - 1964; *Education Level:* 32 (9.64%): college or hight school, 258 (77.71%): bachelor, and 42 (12.65%): masters, PhD; *Income:* 98 (27.84%): < 10 million VND, 105 (29.83%): 11 - 20 million VND, 112 (31.82%): 21 - 30 million VND, 32 (9.09%): 31 - 40 million VND, and 5 (1.41%): > 41 million VND; *Shopping Frequency:* 68 (20.48%): 1/month, 168 (50.6%): 2-3/month, 42 (12.65%): 2-3/week, and 54 (16.26%): 1/week.

3.3. Data Processing Method

The PLS-SEM method using SmartPLS 4.0 software, is employed to evaluate the model and test the research hypotheses based on the survey data. When applying PLS-SEM, the research model is assessed in two steps: Measurement Model: This is done by assessing reliability and validity of the scale, calculate the value of the scale, as well the distinction of variables. Structural Model: This includes tests for multicollinearity, path coefficients, R^2, and effect size (f^2) (Hair et al., 2016).

4. Findings

4.1. Assessing measurement model

According to Hair et al. (2016), to assess the measurement model in PLS-SEM, the factors need to be assessed: the quality of the observed variables, internal consistency reliability, convergent validity, and discriminant validity.

According to Hair et al. (2016), the quality of observed variables is assessed through the outer loading criteria. The recommendation is to retain an observed variable if the outer loading is greater than or equal to 0.7. If the outer loading falls between 0.4 and 0.7, the decision to retain or remove the variable depends on the research purpose and other indicators such as Composite Reliability (CR) and Average Variance Extracted (AVE). If both CR and AVE meet the required thresholds, an observed variable with an outer loading between 0.4 and 0.7 can be retained, provided it is considered meaningful in the research context. In this study, the observed variable P2 (The deadline of product consumption in which you were interested was appropriate) had an outer loading of 0.674. However, both the CR and AVE meet the required criteria, and the content of variable P2 was deemed important in reflecting the logistics in the store. Therefore, P2 was retained. However, observed variable P1, with an outer loading of 0.716, was isolated into a separate group, and thus was removed from the model. After removing P1, the model was reanalyzed, and the results are presented in Table 2.

Table 2. Measurement model assessing results

		Outer loading	Cronbach's alpha	CR	AVE
Product	P2	0.679	0.829	0.875	0.539
	P3	0.738			
	P4	0.735			
	P5	0.790			
	P6	0.750			
	P7	0.710			
Shelf Management	S1	0.798	0.822	0.882	0.651
	S2	0.838			
	S3	0.785			
	S4	0.804			
Return	R1	0.809	0.836	0.901	0.752
	R2	0.898			
	R3	0.893			
Customer Satisfaction	CS1	0.813	0.918	0.936	0.709
	CS2	0.858			
	CS3	0.875			
	CS4	0.843			
	CS5	0.834			
	CS6	0.827			
Repurchase Intention	RI1	0.892	0.898	0.929	0.766
	RI2	0.896			
	RI3	0.861			
	RI4	0.850			

Source: Survey results

Reliability is assessed using Cronbach's Alpha and Composite Reliability (CR). Both coefficients are considered reliable if they exceed 0.7 (Hair et al., 2016). The results in Table 2 show that the Cronbach's Alpha and CR coefficients for all variables fall within the acceptable range, indicating that the measurement scales for each variable are highly reliable.

Convergent validity of the measurement scales is assessed using the Average Variance Extracted (AVE). According to Hair et al. (2016), a measurement scale is considered to have convergent validity if its AVE is greater than 0.5. The results in Table 2 show that the AVE values for all variables are within the acceptable range, confirming that the measurement scales exhibit convergent validity.

Table 3. Discriminant validity

Fornell & Larcker						HTMT				
	CS	P	R	RI	S	CS	P	R	RI	S
CS	0.842					CS				
P	0.719	0.734				P	0.822			
R	0.618	0.561	0.867			R	0.698	0.673		
RI	0.809	0.642	0.576	0.875		RI	0.890	0.742	0.661	
S	0.702	0.719	0.601	0.610	0.807	S	0.803	0.869	0.717	0.702

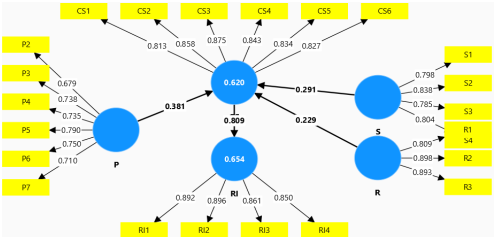
Source: Survey results

Discriminant validity indicates the extent to which a construct is distinct from other constructs in the model. To check for discriminant validity, the square root index of AVE (Fornell & Larcker, 1981) and the HTMT index (Henseler et al., 2015) indices can be

used. Discriminant validity is ensured when the square root index of AVE for a latent variable is greater than its correlations with all other latent variables in the model. Additionally, the HTMT value should be less than 0.85 according to Kline (2015), or less than 0.9 as recommended by Henseler et al. (2015). The results in Table 3 show that the square root index of AVE for each latent variable is greater than the correlations with all other variables. This indicates that each latent variable in the model better explains the variance of its own scales than the variance of the other latent variables. Furthermore, the HTMT values for each pair of constructs are below 0.9, confirming that the discriminant validity criteria have been met (Henseler et al., 2015). Therefore, the measurement model exhibits discriminant validity.

In conclusion, the measurement scales in the model meet the necessary criteria, which confirms the robustness of the measurement model.

Figure 2. Measurement model



Source: Survey results

4.2. Assessing structural model

The assessment of the structural model in this study was carried out according to the approach of Hair et al. (2016), which includes assessing the criteria: checking for multicollinearity, path coefficients, coefficient of determination (R^2), effect size (f^2).

Table 4. Structural Model evaluation and hypothesis testing results

	VIF	Original sample (O)	T statistics	P values	f-square	R-square adjusted	Supported
CS -> RI	1.000	0.809	32.503	0.000	1.890		Yes
P -> CS	2.184	0.381	6.792	0.000	0.175		Yes
R -> CS	1.655	0.229	4.610	0.000	0.084		Yes
S -> CS	2.346	0.291	5.045	0.000	0.095		Yes
CS						0.616	
RI						0.653	

Source: Survey results

To ensure that the model does not suffer from multicollinearity, the Variance Inflation Factor (VIF) must be less than 5 (Hair et al., 2016). The results indicate that all VIF values range from 1.000 to 2.346, confirming that there is no multicollinearity in this study.

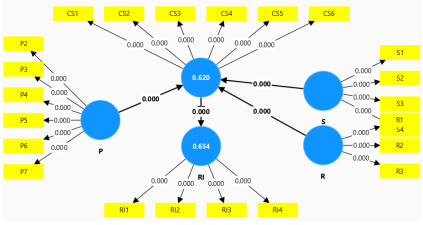
To assess the significance of direct relationships in the model, the analysis of path coefficients is conducted. The Bootstrapping procedure was performed with a magnification factor of 5000 subsamples. Bootstrapping allows for the calculation of t-values and p-values for all path coefficients in the structural model. If the t-value exceeds the critical value, the path coefficient is considered statistically significant. Typically, the critical values for two-tailed tests are 1.65 (10% significance level), 1.96 (5% significance level), and 2.57 (1% significance level). Besides the t-value, p-values are commonly used to assess statistical significance, with a p-value less than 0.05 indicating significance (Hair et al., 2016). Table 4 shows the results of hypothesis testing, indicating that all hypotheses (H1, H2, H3, and H4) have t-values and p-values within the accepted limits. Additionally, all path coefficients are positive, which means that the relationships in the model are positive. The order of impact on the Customer Satisfaction (CS) variable, from strongest to weakest, is as follows: P (0.381), S (0.291), and R (0.229).

R square (R^2) indicates how well the independent variables explain the variation in a dependent variable within the model. According to Hair et al. (2016), R^2 ranges from 0 to 1, with values closer to 1 indicating a high level of explanation, and values closer to 0 indicating a low level of explanation. In SmartPLS, the software also provides R-square adjusted, which reflects a more accurate explanation of the independent variables' impact. R^2 adjusted for Customer Satisfaction (CS) is 0.616, and for Repurchase Intention (RI) is 0.653, indicating a substantial explanatory power according to Cohen (1988). Thus, the independent variables P, S, and R explain 61.6% of the variation in Customer Satisfaction (CS) and 65.3% of the variation in Repurchase Intention (RI).

Effect size (f^2) measures the impact of an independent variable on a dependent variable. According to Cohen (1988), f2 at the values of 0.02, 0.15, and 0.35 respectively represent insignificant, moderate, and strong effect sizes. The results in Table 4 show that Customer Satisfaction (CS) has the largest and most positive impact on Repurchase Intention (RI) with $f^2 = 1.890$. Among the factors influencing Customer Satisfaction, the Product (P) variable has a medium impact ($f^2 = 0.175$), while Shelf Management (S) and Return" (R) have small effects ($f^2 = 0.095$ and $f^2 = 0.084$).

In conclusion, the structural model evaluation demonstrates that all the key criteria have been met.

Figure 3. Structural model



Source: Survey results

5. Discussion

This study aims to examine the impact of in-store logistics on customers' repurchase intentions, with a focus on three key aspects: Product (P), Shelf Management (S), and Return (R), mediated by Customer Satisfaction (CS). The research findings are expected to provide valuable insights for retail managers, guiding them to effectively focus on in-store logistics operations, minimize potential negative impacts, and transform them into drivers of a better retail experience.

As the retail market in Vietnam, especially in major cities like Hanoi, continues to grow rapidly, many retail businesses are implementing strategies and solutions to increase their market share by focusing on customer satisfaction. Customer satisfaction is one of the primary objectives for companies seeking to maintain long-term customer relationships. Satisfied customers (after their purchase) are more likely to develop repurchase intentions. The results of this study support all four hypotheses (H1, H2, H3, H4), which confirm the impact of in-store logistics on customer satisfaction and repurchase intentions. The research model explains 61.6% of the variance in Customer Satisfaction (CS) and 65.3% of the variance in Repurchase Intention (RI). These findings are consistent with and exceed previous research on customer satisfaction (Bouzaabia et al., 2013; Moussaoui et al., 2022; Garouch et al., 2011; Ltifi & Gharbi, 2015) and repurchase intentions (Chatzoglou, 2022).

This study empirically and conceptually demonstrates the direct and causal relationship between Customer Satisfaction (CS) and Repurchase Intention (RI), with a path coefficient of 0.653 and an effect size of 1.890, both of which are very high according to Cohen (1988). Moreover, the study reveals that the Product (P) , which includes ensuring product diversity and providing comprehensive product information, has the strongest impact on customer satisfaction. Following this, Shelf Management (S), which involves ensuring products are always replenished and available, has a secondary impact. Finally, Return (R), which ensure that customers can easily and conveniently return or exchange products, also contribute positively to customer satisfaction. These findings suggest that retail companies, particularly supermarkets, can enhance customer satisfaction by improving in-store logistics, specifically in terms of product, shelf management, and return processes, which in turn drives repurchase intentions among consumers.

Conclusion

In the context of Vietnam, there are many studies related to the retail sector; however, research on logistics theory and its application in retail, especially concerning in-store logistics, is still limited, with few published studies on the topic. This paper aims to systematize the theoretical foundations of in-store logistics in retail and propose a model that evaluates its impact on consumers' repurchase intentions. The findings from this study offer useful suggestions for retail managers, emphasizing the importance of in-store logistics and how to minimize potential negative impacts, turning them into drivers of effective retail experiences.

Despite the valuable insights obtained, the study does have limitations. First, it does not assess the mediating effect of Customer Satisfaction (CS) on Repurchase Intention (RI). Second, the study focuses on testing the roles of three key aspects of in-store logistics - Product (P), Shelf Management (S), and Return (R) - on customer satisfaction and repurchase intentions. Future research could explore the mediating role of Customer Satisfaction and/or expand the scope to include other aspects of in-store logistics, such as "payment convenience" or "shopping convenience".

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THE IMPACT OF MULTI-CULTURAL ENVIRONMENT ON EMPLOYEE PERFORMANCE AT MULTINATIONAL COMPANIES IN HO CHI MINH CITY

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Abstract: ***This research aims to analyze the impact of a multicultural environment on employee performance in multinational companies (MNCs) in Ho Chi Minh City. The author then uses SPSS and AMOS software for quantitative data analysis through the following steps: descriptive statistics, Cronbach's Alpha analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM). The research model on the impact of the work environment on employee performance is tested through these analyses.***

• Keywords: *multicultural environment, employee performance, multinational companies.*

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1. Introduction, research objectives, research method and significance

1.1. Introduction

Deputy Minister of Labor, Invalids, and Social Affairs Le Van Thanh has highlighted that Vietnam is still grappling with issues of low labor quality and job standards, along with a scarcity of skilled professionals (Nguoi Lao Dong, 2020). To address these challenges, it is imperative to focus on enhancing training effectiveness, particularly in the context of multinational corporations (MNCs), where the development and implementation of performance metrics for employees are essential. Additionally, it is vital to study the multicultural dynamics within these organizations, with a specific emphasis on workplace cultural differences, as this understanding is key to boosting employee performance.

Throughout the Covid-19 pandemic, numerous businesses transitioned to remote work. As the pandemic is slowly being contained, multinational corporations (MNCs) are starting to return to regular operations. Nonetheless, they must continue to offer flexible work options and introduce new systems and policies, all of which significantly influence employee performance. Consequently, the multicultural aspect of the workplace is crucial in aiding employees to adjust and enhance their performance.

MNCs in Vietnam are drawn by the young, dynamic, and cost-effective workforce, while also contributing to the transfer of technology and skills to local businesses. International studies, such as those by Jayaweera (2015) and Nanzushi (2015), have shown a positive relationship between multicultural environment and employee performance across various industries and countries. However, in Vietnam, research on the impact of multicultural environment on employee performance remains limited, especially in the context of increasing global integration.

Recognizing this gap, this study aims to synthesize international research models and apply them to the multicultural context of MNCs in Ho Chi Minh City. By doing so, the research seeks to develop solutions to improve employee performance within this environment. Following this overview, the author will explore the topic "The impact of multi-cultural environment on employee performance at multinational companies in Ho Chi Minh city, Vietnam".

1.2. Research objectives

- Investigate how a multicultural environment influences employee performance in MNCs located in Ho Chi Minh City.

- Examine the mediating role of employee collaboration and creativity in the relationship

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between the work environment and employee performance at MNCs in Ho Chi Minh City.

- Based on analysis result, offer practical recommendations and solutions for both employees and MNCs to leverage this relationship for enhancing performance and work outcomes.

1.3. Research method

The author primarily employs quantitative research methods during the official research phase. After gathering primary data from employees of MNCs in Ho Chi Minh city, the author uses SPSS and AMOS software to conduct the quantitative data analysis in the following sequence: descriptive statistics analysis, Cronbach's Alpha reliability analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), structural equation modeling (SEM), analysis of variance (ANOVA), and multigroup analysis.

1.4. Research significance

The study has provided additional evidence and perspectives to explore the relationship between the work environment and employee performance.

In addition to the theoretical contributions, this study also provides some practical recommendations for MNCs in Ho Chi Minh City to improve the work environment, minimize the negative impacts of the negative environmental factors, as well as promote the positive impacts of the strengths of the work environment, multicultural environment, thereby improving the work efficiency of employees, and ultimately bringing positive effects to the performance of the organization.

2. Overview of the impact of multicultural environment on employee performance and research model

2.1. Overview of the impact of multicultural environment on employee performance

Impact of multicultural environment

A multicultural environment, characterized by cultural diversity, can be seen as a double-edged sword, as it has both positive and negative effects.

On the negative side, Xu, D. & Shenkar (2002), and White et al. (2011) argue that cultural differences between individuals, groups, or organizations can lead to problems, conflicts, risks, and communication barriers. Multiculturalism can complicate human interactions and potentially decrease overall employee satisfaction (Lauring & Klitmøller, 2015; Stahl et al., 2010).

On the positive side, Mannix & Neale (2005) and Pettigrew & Tropp (2008) suggest that diverse groups may enhance performance, largely due to the increased potential for learning and creativity. Fitzsimmons and Colleagues (2011) also argue that multiculturalism influences teamwork, cross-cultural negotiations, ethics, leadership, and cross-border mergers and acquisitions.

Given these contrasting perspectives, the author includes the Multicultural Environment as a key factor in the proposed research model, marking a novel aspect of this study. Accordingly, the author proposes the hypothesis: the multicultural environment affects the employee performance at MNCs in Ho Chi Minh City.

Impact of work environment

Okasheh and Al Omari (2017) highlighted that the working environment is a key determinant of employee productivity and work quality. The attractiveness of a workplace influences employees' willingness to learn new skills and their motivation to perform well. Similarly, Chandrasekar's (2011) study arrived at the same conclusion. Kamarulzaman et al. (2011) also found that employee satisfaction with their working environment leads to better work performance. Ollukkaran and Gunaseelan (2012) stated that various environmental factors significantly affect employee motivation and performance levels. In line with this, Susilaningsih (2013) emphasized that a positive working environment helps employees feel more comfortable, whereas an inconvenient environment can reduce their work efficiency (Susilaningsih, 2013).

From these findings, it can be concluded that a positive working environment plays a crucial role in enhancing employee performance. Therefore, after studying the relationship between employees and their workplace, the author proposes the following hypothesis: The working environment has an impact on the employee performance at MNCs in Ho Chi Minh City.

Moreover, as noted by Arsalani et al. (2011), the working environment can be divided into two main components: the psychosocial environment and the physical environment.

The mediating effect of collaboration

Phua (2012) noted that employee disengagement is on the rise, making it increasingly important to create workplaces that positively influence the workforce. According to Udenga (2012), the work

environment encompasses the physical space, job roles, company culture, and market conditions, all of which are interconnected and influence overall employee performance and productivity. Chandrasekar (2011) emphasized that a conducive work environment ensures employee comfort, enabling them to tap into their full potential, which leads to higher performance and engagement. Kahn (1990) identified three key psychological conditions for engagement: meaningfulness, safety, and availability. Meaningfulness reflects how significant the work is to employees, the work environment provides safety, and availability refers to having the necessary resources to complete tasks.

In summary, there is a general consensus that employee engagement positively affects performance. Based on this, the author proposes the following hypotheses: The work environment influences employee collaboration, and employee collaboration impacts employee performance.

The mediating effect of creativity

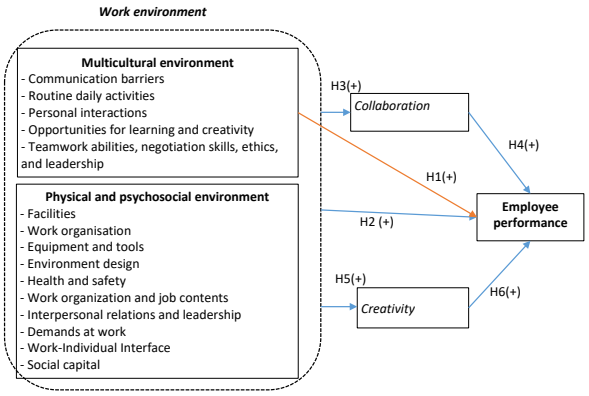
Creative employees play a crucial role in enhancing job performance. These individuals possess the ability to develop innovative solutions to work-related problems and risks. The generation of these new ideas allows them to successfully fulfill job tasks and responsibilities (Ahmetoglu et al., 2015; Shin & Grant, 2020). As a result, creative employees are inherently driven to improve job performance and efficiency. Several empirical studies have confirmed the link between creativity and job performance. For instance, Suh & Shin (2005) examined the relationship between creativity, job performance, and related factors in nonprofit organizations. Moreover, creative activities have both direct and indirect effects on performance-related outcomes (Ismail et al., 2010; Pattnaik & Sahoo, 2021).

In conclusion, there is widespread agreement on the positive impact of creativity on employee performance. To further investigate the mediating role of creativity, the author proposes the following hypotheses: The work environment influences employee creativity, and employee creativity affects employee performance.

2.2. Research model

Drawing from the theoretical foundation and initial quantitative analysis results, the proposed research model is as follows:

Image 1. Research model



Source: Author's proposal

3. Research results

3.1. Characteristics of the study sample

The questionnaire was conducted from January 25 to February 8, 2024. Of the 450 samples distributed, 405 were collected, achieving a 90% response rate. After excluding invalid questionnaires, 400 valid samples were included in the final data analysis.

Frequency analysis results indicated that 205 male employees responded (51.2%), while 195 female employees responded (48.8%). In terms of age distribution, the largest proportion of participants were over 50 years old, comprising 28.0% of respondents. This was followed by the 35–50 age group at 26.8%, and the 25–35 age group at 26.3%. The remaining participants were from other age groups. For average monthly income, 11.3% of employees earned under 7 million VND, 37.0% earned between 7 and under 10 million VND, 49.8% earned between 10 and under 20 million VND, and 2.0% earned 20 million VND or more. In terms of work experience, 16.5% of employees had less than 1 year of experience, 21.0% had 1 to 3 years, 19.0% had 3 to 5 years, 16.0% had 5 to 7 years, and 27.5% had 7 years or more.

3.2. Scale test

Based on preliminary quantitative research results, the scales and variables for the official study include:

- Multicultural environment (ME): 5 variables, coded from ME1 to ME5.

- Physical environment (PHE), consisting of: Environment design (ED): 4 variables, ED1, ED3, ED4, ED5. Facilities (FA): 5 variables, FA1 to FA5. Equipment and tools (ET): 5 variables, ET1 to ET5. Work organization (WO) scale: 4 variables, WO1

to WO4. Health and safety (HS): 5 variables, HS1 to HS5.

- Psychosocial environment (PSE), consisting of: Work-Individual Interface (WI): 7 variables, WI1 to WI5, WI7, WI8. Interpersonal relations and leadership (IL): 7 variables, IL5 to IL9, IL1, IL3. Demands at work (DW): 6 variables, DW4 to DW8, DW1. Work organization and job contents (WJ): 5 variables, WJ1, WJ2, WJ3, WJ5, WJ6. Social capital (SC): 4 variables, SC1 to SC4.

- Creativity (CR): 3 variables, coded from CR1 to CR3.

- Collaboration (CO): 4 variables, CO1 to CO4.

- Efficiency of work (EP), including TP, CP, and WB. TP has 5 variables, TP1 to TP5. CP has 7 variables, CP1 to CP6, CP8. WB has 5 variables, WB1 to WB5.

The reliability analysis results indicated that all scales had Cronbach's Alpha coefficients above 0.7. Consequently, no variables were removed from the model, and all were retained for testing through EFA analysis.

EFA analysis results revealed that for the scales of multicultural environment, creativity, and collaboration, all variables were retained. For the physical environment scale, variable ET5 was removed. In the psychosocial environment scales, variables WI1, IL1, WJ5, and WJ6 were removed. In the work performance scale, all variables were retained.

The next step is the scale testing by CFA analysis, with the specific results as follows:

- Multicultural environment scale: This scale includes one ME factor with five variables. The results indicate that the data aligns with the market model, and the ME scale demonstrates unidimensionality. However, the AVE for ME could not be achieved initially, as variable ME2 had the lowest standardized coefficient at 0.557. After removing ME2, the AVE remained below 0.5, prompting the removal of ME4, which had a standardized coefficient of 0.579. In the refined CFA model, all standardized regression coefficients exceed 0.5 and are statistically significant. The ME scale indices meet all criteria, confirming the scale's convergent validity.

- Collaboration & Creativity Scale: This scale comprises two factors Collaboration (CO) with four variables and Creativity (CR) with three variables. The results of the CFA model analysis indicate that the data align with the market model, and the CO & CR scale demonstrates unidimensionality. All variable estimates meet the acceptable standards (≥ 0.5), with p-values highly significant ($p < 0.001$). The convergence indicators for the scale meet all criteria, confirming that both the CO and CR scales achieve convergent validity.

- Physical environment scale: This scale comprises five factors—FA with 3 variables, WO with 3 variables, ET with 4 variables, ED with 3 variables, and HS with 5 variables. Initially, the AVE for ED was not achieved due to variable ED3, which had the lowest standardized coefficient. After removing ED3, the CFA model results indicate that all standardized regression coefficients are significant and exceed 0.5. Although the model aligns with market data, CMIN/df = 4.143 (> 3), suggesting the model has not fully met the fit criteria. With no error correlation between components, the measurement of constructs is unidirectional. All CR indices for FA, WO, ET, ED, and HS exceed 0.7, confirming factor reliability. The AVE indices are all above 50%, demonstrating convergent validity for all five components. After removing ED3, FA, WO, ET, ED, and HS show correlation coefficients and variable standard errors below 1. Additionally, MSV < AVE, and MaxR(H) coefficients are all higher than the respective correlation coefficients, confirming discriminant validity for FA, WO, ET, ED, and HS.

- Social psychological environment scale: This scale includes five factors: WJ with 3 variables, IL with 6 variables, DW with 6 variables, WI with 6 variables, and SC with 4 variables. Initially, the SC factor did not meet the AVE condition (AVE < 0.5) due to the SC2 variable, which had the lowest standardized coefficient (0.575). After removing SC2, the AVE for SC remained insufficient, leading to the removal of SC1. In the refined CFA model (excluding SC2 and SC1), all standardized regression coefficients exceed 0.5 and are statistically significant. The model fit indices indicate that the social psychological environment scale aligns well with market data. With no error correlation among components, construct measurement is unidirectional. All CR indices for WJ, IL, DW, and WI exceed 0.7, confirming the composite reliability of these factors and establishing convergent validity across the five components WJ, IL, DW, SC, and WI. Additionally, all MSV coefficients are less than

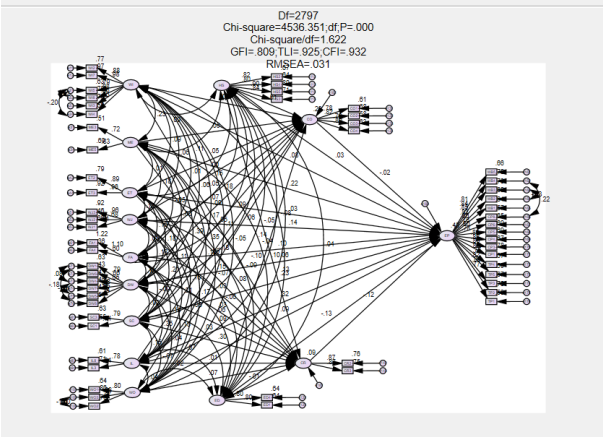
AVE, and MaxR(H) coefficients for WJ, IL, DW, and WI are higher than the correlation coefficients of the main scale, affirming discriminant validity (excluding SC). Consequently, SC is excluded from further analysis due to insufficient reliability and discriminant validity.

- Efficiency of work scale (EP): This scale includes three factors task performance (TP) with 5 variables, contextual performance (CP) with 6 variables, and counterproductive work behavior (WB) with 3 variables. The CFA analysis results show that the data align with the market model; however, the EP scale does not achieve unidimensionality due to error correlations. All variables have standardized regression coefficients that meet the accepted standards (≥0.5) and significant p-values ($p < 0.001$). The CR, AVE, and convergence indicators all meet the required criteria, confirming the convergent validity of the EP scale.

3.3. Research model test results

The SEM analysis model yields results with df = 2,797, a CMIN of 4,536.351, a p-value of 0.000, and a CMIN/df ratio of 1.622, indicating a good model fit with the data. Concurrently, the CFA analysis results confirm the model's alignment with the market data, as demonstrated by evaluation indices such as GFI = 0.809, TLI = 0.925, CFI = 0.932, and RMSEA = 0.031, indicating strong model compatibility.

Image 2. Results of model testing



The detailed model analysis results are shown in the following table:

Table 1: Analysis results of the model

			Estimate (Standardized Regression)	S.E. (standard error)	C.R. (Critical Value)	P
ED	--->	CR	-0.011	0.065	-0.183	0.855
WO	--->	CR	0.071	0.057	1.238	0.216
IL	--->	CR	0.011	0.074	0.163	0.870
SC	--->	CR	0.304	0.088	3.963	***
DW	--->	CR	0.086	0.084	1.349	0.177
FA	--->	CR	0.031	0.041	0.633	0.526
WJ	--->	CR	0.034	0.066	0.571	0.568
ET	--->	CR	-0.070	0.070	-1.185	0.236
ME	--->	CR	-0.175	0.104	-2.347	0.019
WI	--->	CR	0.05	0.068	0.877	0.380
HS	--->	CR	-0.047	0.066	-0.804	0.422
HS	--->	CO	-0.013	0.055	-0.235	0.814
WI	--->	CO	0.035	0.057	0.662	0.508
ME	--->	CO	0.052	0.086	0.764	0.445
ET	--->	CO	0.051	0.058	0.934	0.350
WJ	--->	CO	0.002	0.055	0.028	0.978
FA	--->	CO	-0.054	0.035	-1.138	0.255
DW	--->	CO	0.067	0.070	1.139	0.255
SC	--->	CO	0.167	0.071	2.412	0.016
IL	--->	CO	0.354	0.064	5.457	***
WO	--->	CO	0.062	0.047	1.165	0.244
ED	--->	CO	-0.100	0.055	-1.743	0.081
CO	--->	EP	-0.019	0.037	-0.427	0.669
CR	--->	EP	-0.121	0.031	-2.994	0.003
HS	--->	EP	0.034	0.032	0.919	0.358
WI	--->	EP	0.076	0.032	2.182	0.029
ME	--->	EP	0.216	0.053	4.400	***
ET	--->	EP	0.033	0.033	0.919	0.358
WJ	--->	EP	0.143	0.030	4.026	***
DW	--->	EP	0.063	0.039	1.655	0.098
SC	--->	EP	0.231	0.048	4.223	***
IL	--->	EP	0.315	0.039	6.79	***
WO	--->	EP	0.089	0.028	2.38	0.017
ED	--->	EP	-0.133	0.032	-3.362	***
FA	--->	EP	0.096	0.025	2.402	0.016

Source: data processing results

The table above presents estimated coefficients that illustrate the influence of various factors on employee performance (EP). Notably, nine factors exhibit a P value less than 0.05, corresponding to a 95% confidence level, while one factor shows a P value less than 0.10, indicating a 90% confidence level. These findings confirm that certain scales hold theoretical relevance due to their association with EP, as hypothesized in the research.

When assessing the impact on employee performance (EP), it is evident that the IL has the strongest correlation with EP, with an estimated value of 0.315. Following this, the SC has a relationship with EP, with an estimated value of 0.231, while the ME has an estimated value of 0.216. The WI shows a relationship with EP, with an estimated value of 0.143, and the ED has an estimated value of 0.133. The CR has a relationship with EP, with an estimated value of 0.121, and the

FA has an estimated value of 0.096. The WO has a relationship with EP, with an estimated value of 0.089, and the DW has an estimated value of 0.063.

Furthermore, examining the influence of factors on the mediating variable CR, the findings indicate that the SC has a correlation with CR, with an estimated value of 0.304, while the ME also correlates with CR, with an estimated value of 0.175. Similarly, when evaluating the impact of factors on the mediating variable CO, the results reveal that the IL has the strongest relationship with CO, with an estimated value of 0.354, and the SC has a correlation with CO, with an estimated value of 0.167.

The research model proposes six hypotheses, labeled H1 through H6. Table 1&2 presents the standardized estimation results for the main parameters, including the standardized estimated coefficients, standard errors (S.E.), critical values (CR), and P-values. Most hypotheses have P-values below 5% or 10%, indicating statistical significance and supporting their acceptance. However, hypothesis H4 is not supported and is thus rejected

Table 2: Summary of research hypotheses and estimated values

Hypothesis	Impacting	Coefficients	S.E	CR	P	Conclusion
H1	ME → EP	0.216	0.053	4.400	***	Accepted
H2: ENV → EP	CR → EP	-0.121	0.031	-2.994	0.003	Accepted
	WI → EP	0.076	0.032	2.182	0.029	Accepted
	ME → EP	0.216	0.053	4.400	***	Accepted
	WJ → EP	0.143	0.030	4.026	***	Accepted
	DW → EP	0.063	0.039	1.655	0.098	Accepted
	SC → EP	0.231	0.048	4.223	***	Accepted
	IL → EP	0.315	0.039	6.79	***	Accepted
	WO → EP	0.089	0.028	2.38	0.017	Accepted
	ED → EP	-0.133	0.032	-3.362	***	Accepted
	FA → EP	0.096	0.025	2.402	0.016	Accepted
H3: ENV → CO → EP	SC → CO → EP	0.167	0.071	2.412	0.016	Accepted
	IL → CO → EP	0.354	0.064	5.457	***	Accepted
H4	CO →EP	-0.019	0.037	-0.427	0.669	Not accepted
H5: ENV → CR → EP	SC → CR → EP	0.304	0.088	3.963	***	Accepted
	ME → CR → EP	-0.175	0.104	-2.347	0.019	Accepted
H6	CR → EP	-0.121	0.031	-2.994	0.003	Accepted

Source: Synthesized from model analysis results

4. Conclusions

The author used quantitative research methods, and the findings showed that, based on the theoretical model, five research hypotheses were supported. However, to reach more accurate conclusions about factors indirectly affecting employee performance, additional refinement of the research model is needed. To assess the impact of factors on employee performance through intermediate variables (indirect effects), the author utilized the AMOS software. This analysis confirms the stability of the research model, showing that the variables influence employee performance through both direct and indirect pathways.

Factors directly affecting employee performance: Hypothesis testing results in table 2 show that ME, WI, WJ, DW, SC, IL, WO, FA, and CR positively and significantly impact employee performance. In contrast, CR and ED negatively and significantly impact employee performance.

Factors indirectly affecting employee performance: The research results indicate that SC and IL have a positive indirect impact on CO, which in turn influences employee performance. Additionally, SC has a positive indirect impact on CR, while ME has a negative indirect impact on CR, both of which subsequently affect employee performance.

Using the SEM model, standardized estimated coefficients were calculated for FA, ED, WO, IL, SC, DW, WJ, ET, ME, WI, and CR on EP, as well as for ED, IL, ME and SC on CR or CO, based on Pedhazur's (1982) combined R^2_M formula. The results showed that the research model explains 81.4% of the variation in EP through both direct and indirect effects (via CR and CO).

$$R^2_M = 1 - (1-R^2_{FA.EP})(1-R^2_{ED.EP})(1-R^2_{WO.EP})(1-R^2_{IL.EP})(1-R^2_{SC.EP})(1-R^2_{DW.EP})(1-R^2_{WJ.EP})(1-R^2_{ET.EP})(1-R^2_{ME.EP})(1-R^2_{WI.EP})(1-R^2_{CR.EP})(1-R^2_{ED.CO})(1-R^2_{IL.CO})(1-R^2_{ME.CR})(1-R^2_{SC.CR}) = 1 - (1-0.096)(1+0.133)(1-0.089)(1-0.315)(1-0.231)(1-0.063)(1-0.143)(1-0.216)(1-0.076)(1+0.121)(1+0.100)(1-0.354)(1+0.175)(1-0.304) = 0.814$$

Therefore, the hypotheses are statistically significant and accepted, except for H4, which is not supported.

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RISK MANAGEMENT AT MOBILE WORLD CORPORATION

MSc. Le Do Thien Truc*

Abstract: ***The study applies the financial risk measurement by using financial ratios and Default risk model (Edward I.Altman's Z-Score model) and operational risk measurement by measuring the quantity of operational risks and quality of risk management. The results are consistent with the explanations of the measurement by financial ratios and default risk model and quantity method of operational risks and quality of risk management that there is Good comment for financial status of Mobile World Corporation and operational risk figured out as Event risk. As a result, TOWS method is used to reach the solutions for the risk found out.***

• Keywords: *risk assessment, financial risk, operational risk, risk management assessment, mobile world corporation.*

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1. Introduction

Risks can come from various sources including uncertainty in financial markets, threats from project failures (at any phase in design, development, production, or sustainment life-cycles), legal liabilities, credit risk, accidents, natural causes and disasters, deliberate attack from an adversary, or events of uncertain or unpredictable root-cause. Risk management is the identification, assessment, and prioritization of risks (ISO 31000:2009) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. Risk management's objective is to assure uncertainty does not deflect the endeavour from the business goals. It is important in an organization because without it, a firm cannot possibly define its objectives for the future. If a company defines objectives without taking the risks into consideration, chances are that they will lose direction once any of these risks hit home.

Mobile World Investment Corporation operates under two distribution formats: the thegioididong.com (under the brandname of Mobile World), and "dienmay" (under the domain of Consumer Electronics). Over the past years the Company has been continuously growing despite the unfavourable macroeconomic conditions. Mobile World has been awarded with several international prizes by prestigious organizations, including The Global Growth Enterprise by the World Economic Forum, the Top 5 Fastest Growth Retailer in Asia - Pacific 2010 by Euro monitor International, and the Top 500 Retailers in Asia-Pacific by Retail Asia magazine for 6 consecutive years (2010-2015). Besides, Mobile World's success story has been taught in many leading American business schools such as Harvard University, UC Berkeley, and Tuck School of Business.

As a result, the risk assessment and management of Mobile World Corporation shall be an important part for investors, company owners, regulatory authorities as well as other stakeholders to understand the big success story of this company.

In this study we especially focus on one type of risk, namely the risk of bankruptcy of the company. As a tool of measurement, we apply the Altman Z-score. The Altman Z-score is a formula that was developed in 1967 by Prof. Edward I. Altman. With this score, which is based on five different categories of financial ratios that can be calculated using data from a company's annual report, we can make prediction about the credit-strength of the analyzed company, it means whether the company underlies a high probability of being insolvent. This is crucial for any decision making process of stakeholders.

2. Literature review

2.1. Theoretical framework of risk and risk management

Risk, according to ISO 31000:2009 is defined as the "effect of uncertainty on objectives". There are two types of risk as financial risk - "risks associated with financing, including financial transactions and loans in risk of default" and operational risk - "the risk of indirect or indirect loss due to inadequate or failed internal processes, people, and systems or from external events".

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Risk management is the identification, assessment, and prioritization of risks (defined in ISO 31000 as the effect of uncertainty on objectives) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of opportunities. Risk management's objective is to assure uncertainty does not deflect the endeavor from the business goals.

In the next section we explain financial risk and how calculation can be made to assess the profitability, leverage, liquidity, solvency and activity of companies. Based on that, the Altman Z-score is introduced for further use of risk measurement.

2.2. Risk measurement

2.2.1. Financial risk measurement

Activity ratios: Measure the efficiency of a company's operations. Major activity ratios include inventory turnover, days of inventory on hand, receivables turnover, days of sales outstanding, payables turnover, number of days payables, working capital turnover.

Liquidity ratios: Measure the ability of a company to meet short-term obligations. Major liquidity ratios include the current ratio, quick ratio.

Solvency Ratio: Assess a company's ability to fulfill its long-term obligations. Major solvency ratios include debt ratios and coverage ratios.

Profitability ratios: Net profit margin, ROA, ROE.

Cash flow analysis (CFO, CFI, CFF): Cash flow to revenue, Cash to income, Debt coverage.

Default risk model: Edward I. Altman's Z-Score model

$$Z=1.2x1+1.4x2+3.3x3+0.6x4+1.0x5$$

Where: x1=Working capital/Total assets (%); x2= Retained earnings/Total assets (%); x3= Earnings before interest and taxes/ Total assets (%); x4=Market value of equity/Total liabilities (%); x5=Sales/Total assets (number of times).

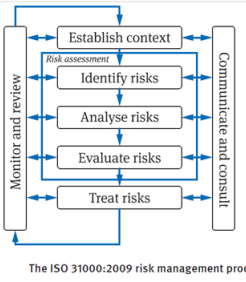
In a general context, the lower the Z-Score, the higher risk of bankruptcy a company has, and vice visa. Scores below 1.81 signify serious credit problems and can mean that the company is probably headed for bankruptcy, where as a score above 3.0 indicates a healthy firm. Scores in the ranges between 1.81 and 3.0 signify firm's conditions needed to be investigated. For investors in the stock market, the value of Altman Z-score can have a great influence on their decision whether to buy or sell a stock. When the Altman Z-Score value is closer to 3, investors may consider purchasing a stock because they expect that the value of the firm will rise in the future due to its healthy financial condition. On the other hand, there is a tendency for investors to consider selling or short-selling a stock if the value is closer to 1.8, because it is supposed that the company is going to face credit problems in foreseeable time and thus decrease in value.

2.2.2. Operational risk measurement

Quantity of risk: According to "Sound Practices for the Management & Supervision of Operational Risk", Basel, operational risk could be defined as "the risk of direct or indirect loss due to inadequate or failed internal processes, people, and systems, or from external events". Quantity of risks could be measured based on People, Process, Systems, Events and Overall. Based on World Bank assessment criteria, these risks could be assessed at High, Moderate and Low degree.

Quality of risk management: Based on recent researches such as ISO 31000 for SME, Risk Management Standard from Institute of Risk management (IRM) and other updates, risk management process has a process as follow.

Figure 1: Risk management process



The ISO 31000:2009 risk management process

Source: IRM

Throughout this guide, the term risk is used describe an uncertainty that has positive or negative consequences; or both positive and negative consequences. Many risks have both positive and negative consequences. The term "risk treatment" is defined as "a process to modify risk". The standard includes the following note: risk treatments that deal with negative consequences are sometimes referred to as "risk mitigation", "risk elimination", "risk prevention" or "risk reduction". The definition of "risk attitude" is defined as "an organization's approach to assess, and eventually pursue, retain, take or turn away from risk". When a risk has a positive consequence, the "pursuit" of the risk is a logical course of action in order to enhance the achievement of objectives. Based on World Bank assessment criteria, the Quality of Risk Management is assessed based on: Board and Senior Management Oversight; Policies, Procedures and Limits; Measurement, Monitoring, and MIS; Internal Controls and Internal Audit.

Degree of quality of risk management could be assessed as Strong, Acceptable, Weak scale

Figure 2: A combination of quantity of risk and quality of risk management

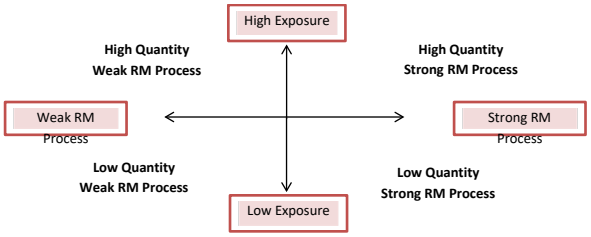


Table 1: Examination Scope Based on Hypothesis

High Quantity – Weak Management	High Quantity - Strong Management
+ Confirm risk assessment + Low reliance internal measures + Full on-site procedures	+ Confirm risk assessment + Rely on internal measures + Modified on-site procedures targeting specific areas
Low Quantity - Weak Management	**Low Quantity - Strong Management**
+ Confirm risk assessment + Low reliance internal measures + Target "Management" section of on-site procedures	+ Confirm risk assessment + Rely on internal measures + Minimal on-site procedures

Source: World Bank

2.3. Managing Risks

Based on the effects of risk factors to possible outcomes, the writer selects the most concerned risk to find the solution by using TOWS analysis of the company.

3. Risk Management at Mobile World Corp

3.1. Company introduction

Mobile World Corporation has its full name as Mobile World Investment Corporation with the stock code like MWG. The company was established under Business Registration License No.4103012275 issued by Planning and Investment Department in Ho Chi Minh City as of the date of 16 January 2009 and other documents with chartered capital at 1,119,567,790,000 VND and invested capital is 1,474,956,147,637 VND. In 2004, thegioididong.com was established and now become the top No.1 retailer in Vietnam with 960 supermarkets (each has area from 100-200 m2) nationwide. In May, 2015, dienmay.com (created in the end of 2010) was officially changed into Dien may Xanh Supermarket, which specializes in electrical appliances and digital products and have 250 supermarkets nationwide in 2016. In the end of 2015, the very first store named Bach Hoa Xanh appeared. Till the end of 2016, Bach hoa Xanh has completed the first trial period with more than 40 supermarkets majoring in Tan Phu, Binh Tan, Ho Chi Minh City areas and achieved positive revenue and good feedbacks from customers. Vuivui.com – the first B2C electronic commercial website was built in the beginning of 2016 and official went into work in delivery in Ho Chi Minh City in Oct, 2016.

3.2. Company's risk status

3.2.1. Financial risk measurement

Financial risk measurement of Mobile World Corporation can be based on the results of research as follows:

- Activity ratios: Overall, activity ratios of MWG implies that the credit policy MWG applying is quite strict, which may hamper sales. Besides, although numbers of day inventory on hand of the company is quite good, and inventory management system of MWG is at good rate. MWG's working capital management is in good condition. As a result, cash conversion cycle of MWG is in good condition as well. Furthermore, working capital management of MWG is superior.

- Liquidity ratios: In general, liquidity ratios of the company reflect the good and acceptable liquidity condition of MWG which proves a healthy business.

- Solvency ratios: Overall, MWG could have the potential solvency risk albeit for the current good debt management system.

- Profitability ratios: Above all, MWG's profitability ratios are still very high, which marks a substantial profitability condition of the company.

- Cash flow analysis: To sum up, cash generating ability of operations of MWG is currently in the problem. Having a look on the cash flow statement of MWG in 2016, we could easily recognize the negative value of cash flow from operations and the positive net cash flow due to the appearance of positive financing cash flow, which majorly comes from money from loans (at approximately 19,961.551billion VND) (an increase than 8,129.262 billion VND in 2015).

Based on the financial analysis of MWG as above, we could figure out the company is still under the investigation of financial risk and financial leverage owing to the cash flow from operations per total debt value and should be investigated more clearly.

As a result, the writer goes deeper by measuring the health of the firm. And it is recommended to apply Edward I. Altman's Z-score model.

$$Z = 1.2X1+1.4X2+3.3X3+0.6X4+1.0X5$$

Based on the figure calculation from financial statement, X1 (Working Captial /Total assets) is at 0.09; X2 (Retained Earnings/Total assets) is at 0.15; X3 (EBIT/Total assets) is at 0.14; X4(Market value of equity/Total liabilities) is at 3.00 and X5 (Sales/Total assets) is at 3.00. As a result, total Z-score is at 5.56.

With the final Z-score result at 5.56 scores (>3.0 scores), we could infer from the value that the firm is currently at healthy status, albeit it is in the question of financial risk and financial leverage of the operating cash flows.

3.2.2. Operational risk measurement

Quantity of Risk

People

The number of staff by the end of 2016 is more than 26,000 employees, higher than in 2015 with 15183 persons. Among that, the number of staffs in supermarkets accounts for the largest percentage (88%). Stood second is the staffs of Business Development department with 1183 in 2016 versus 336 in 2015. Third is of Logistics – Supply chain with more than 500 persons during 2 years.

Bonus or rewarding system: Apart from contractual salary, MWG implements a wide range of salary and bonus policies to recognize and motivate employees to stay engaged and work more productively. Finally, MWG is committed to providing employees with a FRIENDLY, ENGAGING, PROFESSIONAL, STABLE working environment and a fair opportunity for advancement.

Training: MWG regularly organizes training courses such as the New Staff Training Program, Combined Field Training, Professional Development, Soft Skills Training for Call Centres, Customer Care, TCC, E-learning as well as special courses training for the management team, the office block.

Processes (Execution, Delivery & Process Management)

Store Openings: Area Managers shall cooperate with Ground Development Department to look for a potential place to open a store. Based on detailed analysis, Ground Development Department shall decide to select the place and continue on the upcoming procedures and transfer the place to Sales Department (handled by Area managers) to inform and work with Brand Department (in charge of goods selection, purchasing, and dealing at best prices..) and other related parties such as Human resources (training staffs), Marketing (in charge of shop image management, incentive programs), Accounting (in charge of cashier), Administration to complete all necessary processes to open a store at an agreed/fixed date.

The core store supervising department: Sales Department (with the structure as: 1.Lowest: Store manager/ 2. Area Manager/ 3. Regional Sales Manager/ 4. Highest: Senior Regional Sales Manager).

All departments work collaboratively in mutual supports.

Delivery system: Brand department shall appoint its inferior named Logistics dept. to do the timely calculations. Central warehouses shall delivery goods nationwide. Inventory is managed and handled within 30 days dictated by ERP system.

Sales and marketing campaigns: MWG apply the same campaigns (banners, loudspeakers, standees, TVs, newspaper, online advertisings, etc) nationwide for every shop at agreed time.

Systems (Business Disruption & Systems Failure)

Modern IT system is used to control the business systems such as ERP system for controlling inventory management system (Accounting). For fresh products, the system is being built, Goods – prices - incentives (Marketing), Employee Appraisal Program for Sale point ticking after work hours (Human resources); Hotline for receiving prompt feedbacks from customers (Sales & Customer services).

External events (Clients, Products, and Business Practices; Damage to Physical Assets)

There are macroeconomics risk, competitive rivalry, loss of goods at the supermarket and risk of inventory price decrease.

Risk assessment

People: There are currently 26000 people in MWG at the end of 2016. Personnel in the store system are suitably recruited, well-trained and familiar with job requirements. Besides, they are well-supported, got promotion or considered for rotation every 6 months by the human resource and reward policy of the company. Quantity of Risk: Low

Processes (Execution, Delivery & Process Management): The activity consists of few control points; simple, easy to understand activities and a relatively non-specialized knowledge base. Moreover, extensive use of straight-through processing with little or no manual intervention (ERP system). Besides, branches, operation centers and personnel operate smoothly within a local geographic area (nationwide in Vietnam). Quantity of Risk: Low

Systems (Business Disruption & Systems Failure): The organization's business operations utilize industry standard networks. Moreover, MWG retains a non-stop level of technological innovation, and selectively implements emerging technologies that are consistent with its business plan. Quantity of Risk: Moderate

External events (Clients, Products, and Business Practices; Damage to Physical Assets): MWG is facing the macroeconomics risk of unstable exchange rate, high unemployment rate, high inflation rate, a

decrease of consumer trust in the future. Besides, strong competitions with other retailers are very fiercely. Furthermore, risk of inventory price decrease has been hampered the operation process of the company quite far. Apart from that, the fear of losing goods at supermarket has been another issue of MWG. Quantity of Risk: High

Company's risk management status

Board & Senior Management Oversight & Policies, Procedures and Limits: Based on the Annual report of MWG 2016, Boards of Directors and Managers are strictly controlled and supervised by Supervisory Board. Year 2016 is the year MWG finishes expanding dienmayxanh chain throughout 63/63 provinces, completes the trial of mini grocery supermarket model "Bach hoa Xanh" and with the plan as above, Boards of Directors and Managers have performed all the rules and requirements of the company's business plans and regulations.

Monitoring and Management Information System & Internal Control, Audit: Assumptions, data resources, and procedures used for monitoring are appropriate, adequately documented, and tested for reliability. Operational risk is systematically identified and assessed, impeded at least annually by supervisory board. Supervising and evaluating commitments of all departments to the supermarkets/ stores are conducted (including promotional expense management procedures, business cost management procedures, store management procedures, business process management at supermarkets, inventory and cash control at supermarkets, cost of renting business premises control process, procedure to control the use of loans). Supporting and consulting in building up IT and monitoring systems of the company are implemented. Besides, External Audit Company's team has already been assessed for education levels, skills and resources and effectiveness to be chosen as Ernst & Young Vietnam Co., Ltd by Supervisory Board. Quantity of Risk: Strong

Whole reflection of every risk occurrence and assessment

Based on the analysis above of Financial Risk and Operational Risks, we assesses and selects Operational Risk 4 - Event Risk for impact of macroeconomics on the current operation of MWG and its competitive rivalry to go deeper and look for recommendations to soften this issue.

4. Solutions and suggestions to improve risk management at the firm

Since the risk is assessed as high exposure but under the controlling status of strong risk management, the strategies to suggest recommendations should be as follows.

- Confirm risk assessment
- Rely on internal measures
- Modified on-site procedures targeting specific areas

Due to the fact that we have already realised the risk of the economy's macroeconomics (unstable exchange risk, high unemployment rate, high inflation rate, a decrease of consumer trust in the future), fierce competitions with other retailers, fear of inventory price decrease, losing goods at supermarket, it is a must that MWG should follow the above recommendations. More apparently, MWG should set up its strategies by maintaining the current growth of thegioididong. com chain, focusing on Dienmayxanh.com in 2017 -2018 and switching to Bach hoa xanh from 2018 and developing Vuivui.com in the long-term.

Conclusion

The study has shown the operational risk (event risk), which reveals the current difficulties of MWG. MWG is now facing the downturn of macroeconomics, competitive rivalry, a decrease in inventory price and loss of goods in supermarkets. As a result, we propose the suggested solutions for the risk above as: Maintaining the current growth of thegioididong.com chain; Focusing on Dienmayxanh.com in 2017 -2018; Foster Bach hoa xanh from 2018; Long-term prospect - develop Vuivui.com.

To sum up, although Mobile World Corporation has big risks, methods to solve the issues of the company always prove its outstanding operations and performances to make preparations for handling unexpected events in the short-term and long-term future. And this story should be learned for any companies from now on.

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ASSESSING AND FORECASTING THE RISK OF FINANCIAL STATEMENT FRAUD OF ENTERPRISES LISTED ON THE VIETNAMESE STOCK MARKET - A LOGISTIC REGRESSION MODEL APPROACH

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Nguyen Thi Thanh Huyen* - Bui Trinh Minh Ngoc*

Abstract: ***This article aims to assess and forecast the risk of financial statement fraud of enterprises listed on the Vietnamese stock market from 2018 to 2023. Based on the application of the Logistic Regression model with machine learning technique together with the famous M-Score model of Beneish (first published in June 1999) on the data collected from 25 enterprises, including 279 observations. The results of the study show that the application of the logistic regression model is capable of detecting fraud risks in financial statements with relatively high reliability. Most indicators have the same impact on the likelihood of fraudulent financial reporting.***

• Keywords: *financial statements, fraud risk assessment and forecasting, logistic regression model, m-score model, vietnamese stock market.*

JEL codes: B26, C58, D53

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1. Introduction

Financial statements are a set of documents created by an enterprise to reflect the financial situation of an enterprise at a certain time or in a certain period. Financial statements provide information on the situation of assets, liabilities, equity, and business results of the enterprise. Financial statement fraud is the act of deliberately manipulating, falsifying, or omitting information in financial statements to deceive relevant parties, such as investors, creditors, and regulatory agencies. The main forms of fraud are false declaration of expenses (hiding part of the cost to increase profits), declaring debts (minimizing liabilities to improve the financial situation), increasing revenue shorts (recording unrealized revenue or increasing revenue higher than reality), and misvaluation of assets (valuing assets higher than their real value to increase total assets).

Financial statement fraud is a sore problem in Vietnam's stock market, as many listed companies deliberately falsify financial information to deceive investors and regulators. In recent years, the number of fraud detections has tended to increase, especially in high-risk industries such as real estate, banking, and finance. Some typical cases can be mentioned, such as FLC Group with false disclosure of financial statements, Tan Hoang Minh related to fraudulent bond issuance, or Louis Holdings with allegations of manipulating stock prices. These frauds not only cause great losses to investors but also reduce confidence in the stock market, negatively affecting capital flows and financial stability. Therefore, to detect fraudulent acts early and protect the interests of stakeholders, it is extremely necessary to build fraud risk forecasting models. This study focuses on the application of the logistic regression model to assess and forecast the risk of financial statement fraud of enterprises listed on the Vietnamese stock market.

Logistic regression is a statistical technique widely used in machine learning to predict the probability of a binary event (with or without fraud) thanks to its ability to determine the probability of fraud occurring based on a variety of input financial variables, such as debt-to-equity ratio, operating cash flow, net profit, or irregularities in revenue fluctuations. One of the key advantages of logistic regression is its high explainability, which makes it easy for managers,

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auditors, and investors to understand the impact of each factor on the likelihood of fraud. In other words, it helps us answer the question: "What are the chances of this event happening?" The authors based on the Financial Fraud Assessment Model was made public by Beneish in June 1999 and some other application, like Score (2016). A logistic regression model (see Alpaydin (2020)) will be applied on the financial statement data of 25 companies in the period 2018-2023 to assess and forecast the risk of financial statement fraud of enterprises in the Vietnamese stock market.

In addition to the introduction, the rest of the research paper is presented as follows: Section 2 is an overview of previous studies, section 3 presents research results, and section 4 contains conclusions.

2. Research Overview

In the context of Vietnam's growing stock market, ensuring the transparency and accuracy of corporate financial information is extremely important. However, financial statement fraud is still a worrying issue, affecting investor confidence and market stability. There have existed numerous studies on assessing and forecasting the risk of financial statement fraud of enterprises as listed belows.

Dong et al. (2018) assembled a distinctive dataset comprising 64 fraudulent firms and an equivalent sample of 64 non-fraudulent firms, along with social media data preceding each firm's alleged fraudulent violation as documented in Accounting and Auditing Enforcement Releases (AAERs). The proposed framework automatically extracted various indicators, including sentiment features, emotional characteristics, topic-related attributes, lexical elements, and social network metrics, which were subsequently input into machine learning classifiers for fraud detection. The performance of the algorithm was evaluated and compared against baseline methods that relied exclusively on financial ratios or language-based features.

With a similar topic, Maranzato et al. (2010) examined the detection of fraudulent activities targeting reputation systems in e-markets. The primary objective was to generate a ranked list of users (sellers) based on their likelihood of engaging in fraud. Initially, transaction-related characteristics indicative of fraudulent behavior were identified and extended to sellers. A basic ranking method was outlined, which classified sellers by tallying these fraud-related attributes. Subsequently, additional characteristics unsuitable for the counting approach were incorporated, and logistic regression was applied to both the original and enhanced datasets. Using real data from a prominent Brazilian e-market for training and evaluation, the enhanced approach with logistic regression demonstrated superior performance. The final ranked list identified 32.1% of the most probable fraudsters targeting the reputation system, achieving a 110% increase in identified cases while confirming zero false positives.

In addition, Aftabi et al. (2023) presented an innovative approach leveraging generative adversarial networks (GAN) and ensemble models to address the scarcity of non-fraudulent samples while effectively managing the high-dimensional feature space. A new dataset was developed by compiling annual financial statements from ten Iranian banks and extracting three categories of features as outlined in the study. Experimental results on this dataset revealed that the proposed method excelled in generating synthetic samples susceptible to fraud, demonstrating its efficacy.

Previously, Beneish (1999) used financial measures to analyze 363 samples collected and obtained from 49 violating enterprises. It was pointed out that companies with unusual revenue growth rates compared to the industry are highly likely to have manipulated profits. While recently, Mutemi & Bacao (2024) presented a text-based fraud detection framework designed to mitigate financial losses effectively. The framework consisted of four essential components: text preprocessing, representation, knowledge extraction through machine learning algorithms, and model evaluation. By incorporating data augmentation techniques, it improved the performance of classifiers in identifying fraudulent activities. The proposed approach, which employed a combination of FastText and Random Forest classifiers, attained a remarkable F1 score of 0.833 and an AUC score of 0.99 on an augmented dataset, outperforming traditional keyword-based models.

Thanks to that kind of idea, this research based on the M-score model and applying the decision tree model to assess and forecast risk of Financial Statement Fraud of Enterprises Listed on the Vietnamese Stock Market with data extracted from financial statements of enterprises listed on the Vietnamese stock market with 25 enterprises, including 279 observations, in the period from 2018 to 2023, which is an updated version for seeking new empirical results.

3. Research results

3.1. Research data and model

The data used in this analysis of 25 enterprises listed on the Vietnamese stock market was collected from https://cafef.vn in the period from 2018 to 2023, including 279 observations. The dataset of 8

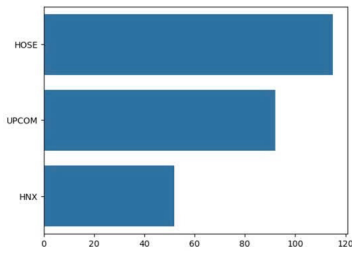
observation variables was built and processed based on the M-score financial fraud assessment model (see Beneish (1999)).

*M-score = – 4.84 + 0.92*DSRI + 0.528*GMI + 0.404*AQI + 0.892*SGI + 0.115*DP – 0.172*SGAI + 4.679*TATA – 0.327*LVGI.*

Where M-score is the dependent variable, predicting possibility of financial statement fraud, independent variables include DSRI (Days' Sales in Receivables Index) which is the average collection period change index, GMI (Gross Margin Index) is the index that measures the decline in a company's profit margin over time, AQI (Asset Quality Index) measures the increase in long-term assets other than fixed assets, SGI (Sales Growth Index) measures sales growth rate, DP (Depreciation) is the index of depreciation reduction of the company, SGAI (Sales, General and Administrative Expense) assesses the change in the ratio of selling and administrative expenses to net revenue, TATA (Accruals) is the accrual variable on total assets, and LVGI (Leverage Index) compares total corporate debt to total assets.

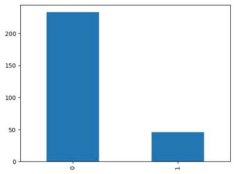
From the overview of the research data, it can be seen that in the research dataset, there is a difference between the number of enterprises collected on stock exchanges and the number of enterprises collected each year. The HOSE stock exchange has the largest proportion of enterprises included in the study and is followed by UPCOM and HNX, respectively. In Figure 1, the vertical axis offers stock exchanges, while horizontal one presents the quantities of businesses studied.

Figure 1. The number of businesses included in the study of each exchange



Source: Drawn by the authors

Figure 2. Number of enterprises at risk of financial statement fraud and not at risk of financial



Source: Drawn by the authors

In Figure 2, businesses at risk of financial statement fraud are labeled 1; businesses without risk of financial statement fraud are labeled 0. Additionally, the research data is divided into two parts in an 80/20 ratio, corresponding to 80% of the data for the model training process and 20% of the data for the model performance testing process.

3.2. Empirical results

A decision tree model is programmed in Python and trained on the training dataset; after completing the training, the effectiveness of the model is clarified. Table 1 presents the results on decision tree model accuracy executed on the test dataset.

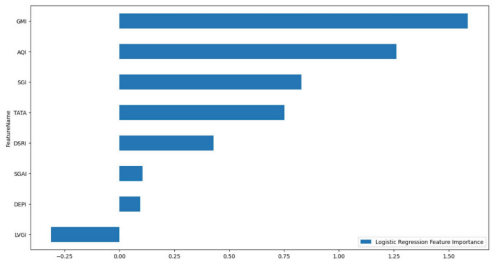
Table 1. Decision tree model accuracy results on the test dataset

```
Confusion matrix:
    0  1
0  45  0
1   5  6

Classification report:
              precision    recall  f1-score   support

           0       0.90      1.00      0.95        45
           1       1.00      0.55      0.71        11

    accuracy                           0.91        56
   macro avg       0.95      0.77      0.83        56
weighted avg       0.92      0.91      0.90        56

Logistic Regression accuracy on the test set:  0.9107
```

Source: Summarized by the authors

Out of a total of 45 cases of non-fraudulent financial statement predictions, there were 45 cases of accurate predictions, none of which were fraudulent. Similarly, out of a total of 11 cases of financial statement fraud predictions, there were 6 cases of accurate predictions and the remaining 5 cases of non-fraud. The model with high accuracy (> 0.9) means that the accuracy of the points found is high, and a high recall means a high true positive rate, which means that the rate of missing positive points is low, indicating that the model does not miss a significant number of cheats. In addition, a high F1 score and an overall accuracy of 91.07% also indicate that the model has good predictive ability. Detailed influence of each factors included in M-Score model on the likelihood of fraud is illustrated in Figure 3.

Figure 3. The impact of the indicators on the likelihood of fraud



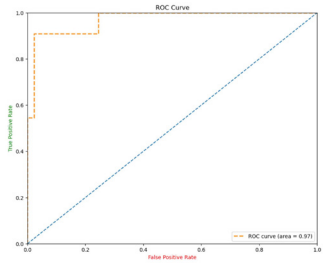
Source: Summarized and drawn by the authors

One can see that the indices "DSRI," "AQI," "GMI," "SGI," "TATA," "DEPI," and "SGAI" have a

positive impact on the likelihood of fraudulent financial reporting. Specifically, the index with the most impact on the logistics regression model is "DSRI," followed by "AQI," "GMI," "SGI," "TATA," "DEPI," and "SGA"; the impact level decreases, respectively. In contrast, the variable "LVGI" hurts the target in the logistic regression model, which means that when this indicator decreases, the likelihood of fraud increases.

The ROC line of the logistic regression model is very close to the upper left corner of the chart and tends to approach the y-line = 1, as in Figure 5, showing that the classification and forecasting ability of the model is appropriate.

Figure 4. ROC Curve Graph



Source: Drawn by the authors

In addition, Area Under the Curve (AUC) = 0.97 (close to 1) also indicates that this model has good performance.

4. Conclusion

This study has shown that the application of the Logistic regression model in assessing and forecasting the risk of financial statement fraud brings high efficiency thanks to the ability to accurately classify, clearly interpret, and have flexible applicability on the financial data of listed enterprises. However, to improve practice efficiency, it is necessary to have a close combination of mathematical models and traditional audit methods and apply them to automated financial monitoring systems to detect businesses with signs of fraud early. Auditing firms, regulatory agencies such as the State Securities Commission, and institutional investors can integrate this model into the risk analysis system to build a set of criteria for assessing financial transparency, thereby improving the quality of audits and risk management.

Although logistic regression has proven effective in research, there are still some limitations that need to be overcome to further optimize the model. One of the key improvements is the optimization of input variable selection, which can be done using the Lasso Regression or PCA method to reduce noise and eliminate variables that are not important. In addition, standardizing the data and using methods to handle data imbalances such as SMOTE (Synthetic Minority Over-sampling Technique) will help improve accuracy when the percentage of fraudulent businesses in the study sample is usually very low compared to non-fraudulent businesses. Another direction is to experiment with nonlinear regression models, such as multinomial logistic regression or in combination with Bayesian logistic regression algorithms, to enhance accuracy in cases where data has many nonlinear characteristics.

In addition to the logistic regression model, future research can be expanded by combining it with other machine learning algorithms in the supervised learning and unsupervised learning teams. In the supervised learning group, models such as Random Forest, XGBoost, or SVM (Support Vector Machine) can improve accuracy by leveraging offline learning capabilities and minimizing overfitting. In particular, ensemble models such as bagging and boosting can be applied to combine logistic regression with more powerful algorithms to optimize predictive performance. In the Unsupervised Learning group, methods such as K-Means Clustering or Autoencoders can help detect anomalies in financial data, thereby providing additional indicators for the Logistic Regression model.

In conclusion, this study not only confirms the effectiveness of logistic regression in detecting financial reporting fraud but also opens up many directions for improvement and combination with other machine learning models to improve accuracy and practical application. The implementation of the model in the automatic financial monitoring system will help Vietnam's stock market become more transparent, contributing to protecting the interests of investors and improving the stability of the economy.

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THE EVOLUTION OF TAX COMPLIANCE RISK MANAGEMENT IN THE DIGITAL ERA: FROM TRADITIONAL TO TECHNOLOGICAL DRIVERS

PhD. Phan Hong Hai*[1] - Assoc.Prof.PhD. Dang Anh Tuan*[2]

Abstract: ***In the context of digital transformation and globalization, tax authorities have undergone three phases of tax management methodology development: (i) personalized approaches, (ii) taxpayer segmentation, and (iii) risk-based management. This evolution reflects the emergence of a tax compliance ecosystem, where digital technologies and multi-stakeholder collaboration play a central role. The article analyzes the shift in tax compliance risk management strategies through the OECD's analytical framework (2004) and updated reports, focusing on three key drivers: the application of big data and artificial intelligence (AI), the integration of behavioral science, and the promotion of international transparency. Research findings indicate that adopting advanced analytical technologies and automated interventions (e.g., Australia's ANGIE tool) reduces administrative costs by 25–30% while enhancing fraud detection efficacy. However, challenges persist in updating legal frameworks and building technological capacity. The article proposes an integrated approach combining proactive management, multinational cooperation, and targeted resource allocation to optimize tax compliance in the digital era.***

• Keywords: *tax compliance, risk assessment, tax fraud, audit.*

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1. Introduction

The core mandate of tax authorities is to collect revenue to fund public services and ensure resources for socio-economic development (OECD, 2024). In the context of globalization and digital transformation, tax administrations have continually refined their management approaches through three primary phases: (i) Personalized approach managing individual taxpayers separately. This method proved inefficient due to limitations in human and financial resources; (ii) Segmented approach classifying taxpayers into groups based on tax rates or operational scale. While improving efficiency, this approach still carried compliance risks due to the lack of systemic risk assessment mechanisms; and (iii) Risk-based management focusing on high-risk groups, leveraging multi-source data and analytical technologies to optimize tax collection effectiveness (OECD, 2017).

This evolution reflects the trend toward a tax compliance ecosystem, where tax authorities act as regulators and collaborate with third parties (e.g., tax service providers and financial institutions) to share data and design risk prevention strategies. Key drivers of this shift include (i) the adoption of big data analytics and artificial intelligence (AI) for risk forecasting, (ii) the demand for behavior-based, personalized interventions, and (iii) the push for transparency through international cooperation agreements (OECD, 2023). This paper contributes to the analysis of the evolution of tax administration strategies from a compliance risk assessment perspective.

2. The Evolution of Tax Compliance Risk Management: From Self-Assessment to Data Ecosystems

Since the widespread adoption of self-assessment mechanisms in the 1970s-1980s, tax authorities have shifted their focus to risk-based management methods to optimize taxpayers' voluntary compliance while minimizing stakeholder administrative and compliance costs (OECD, 2004). Although this mechanism accepts most tax declarations at face value, tax administrations have developed analytical tools to identify returns requiring post-audit checks. The emergence of data analytics software and AI has refined tax assessment processes, making them more sophisticated, adaptable, and personalized to factors such as industry characteristics, business scale, macroeconomic conditions, and taxpayer group behavior (OECD, 2016a).

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2.1. OECD's Compliance Risk Management Framework

In 2004, the OECD published its foundational document, Compliance Risk Management: Managing and Improving Tax Compliance (OECD, 2004), which established a compliance risk management framework based on a cyclical three-step process (Figure 1):

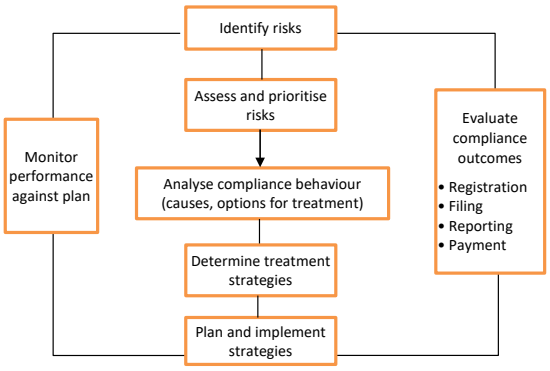
Risk Assessment: Identify and categorize compliance risks using historical data and taxpayer behavior patterns.

Strategy Design: Develop targeted intervention plans for high-risk groups.

Monitoring and Optimization: Measure strategy effectiveness and adjust based on real-world feedback.

This framework remains relevant nearly two decades later, particularly in transitioning from individualized management to a compliance ecosystem. Tax authorities integrate multi-source data and advanced technologies to enable real-time risk forecasting (OECD, 2017).

Figure 1: Tax Compliance Risk Management Process



Source: OECD (2004), "Compliance Risk Management: Managing and Improving Tax Compliance"

2.2. Emerging Approaches in Risk-Based Tax Management

Tax compliance risk management was first explored in depth at the 2004 Forum on Tax Administration (FTA) titled Compliance Risk Management: Managing and Improving Tax Compliance (OECD, 2004), a framework that remains valid and widely adopted today. Subsequent publications have documented shifts in methodologies and the integration of new technologies into tax administration. In 2016, the FTA released a supplementary guidance report, Cooperative Compliance: Building Better Tax Control Frameworks (OECD, 2016b). It proposed and discussed frameworks for tax control and methods to evaluate their practical relevance and effectiveness. In 2017, the FTA published The Changing Tax Compliance Environment and the Role of Audit (OECD, 2017), analyzing transformative trends in tax administrations that collectively reshape the compliance ecosystem, enabling more efficient compliance targeting and management. Synthesizing these reports, three dominant trends emerge:

Behavioral science applications: The report Understanding and Influencing Taxpayer Compliance Behaviour (OECD, 2010) identified five key drivers of tax compliance: opportunity, social norms, fairness, economic incentives, and deterrence. Later, in 2021, the OECD emphasized the integration of behavioral insights into policy design in Using Behavioural Insights for Better Tax Administration (OECD, 2021). Examples include personalized messaging to boost voluntary filing rates.

Shift from reactive to proactive Models: Tax authorities are transitioning from addressing compliance "symptoms" (e.g., post-violation audits) to targeting root causes of non-compliance. The report Starting from Scratch: Influencing the Compliance Environment for Small and Medium Enterprises (OECD, 2012) advocated embedding compliance into operational workflows at the system design stage.

Multi-Stakeholder Collaboration and Digital Innovation: The Tax Compliance by Design report (OECD, 2014) recommended leveraging Application Programming Interfaces (APIs) to integrate tax systems with business platforms and automate declaration processes. In 2019, the OECD's Unlocking the Digital Economy: A Guide to Implementing APIs in Government (OECD, 2019) promoted real-time data integration from e-commerce and fintech platforms to enhance compliance monitoring.

2.3. Changes in Tax Compliance Risk Management Strategies

While the compliance risk management framework and its principles remain valid, several strategic shifts have emerged, including:

• *Advanced sata analytics-driven approaches:* Traditional tax risk management processes beginning with risk identification, assessment, and prioritization are now enhanced by big data and AI. According to an OECD (2024) survey of 52 tax administrations, 80% use big data to improve risk forecasting accuracy, and 50% deploy machine learning to detect tax fraud, reducing manual audit time by 25% (OECD, 2024). Sophisticated analytical models enable the processing of multidimensional datasets (e.g., industry sector, business scale, filing behavior), facilitating automated interventions.

• *Automated intervention mechanisms:* Tax authorities increasingly deploy multimodal tools to detect discrepancies, leveraging AI for analysis and risk clustering to select intervention methods. Examples include:

- *Data matching* between internal systems and external sources (e.g., bank transactions).

- Social media analytics to identify anomalies in business activities.

- *Risk clustering algorithms*, such as Australia's ANGIE (Automated Network and Grouping Identification Engine), automate the identification of complex taxpayer relationships, cutting investigation time by 30% (OECD, 2024). Post-identification, authorities may issue automated requests for additional information or conduct comprehensive e-audits targeting specific transactions.

• *Real-time intervention timing:* Digital platforms enable real-time or near-real-time interventions. Through API integration and IoT (Internet of Things) systems, tax administrations can:

- Monitor financial transactions as they occur (*real-time monitoring*).

- Detect anomalies in tax declarations via automated alerts.

• *Unstructured data utilization and cross-border collaboration:* Tax authorities now harness unstructured data from social media, electronic contracts, and shared reporting templates, moving beyond structured internal or national datasets. Enhanced international collaboration particularly among emerging economies has strengthened compliance capabilities. OECD (2023) reports a 40% increase in automatic tax information exchange between 2015 and 2023, alongside efforts to standardize global tax data integration. Multilateral cooperation within the compliance ecosystem has uncovered 15-20% of multinational tax evasion cases.

Figure 2: Changes in Risk-Based Tax Management Strategies

• *Resource allocation prioritization:* Tax administrations focus on two priority groups:

- Large Enterprises: Contributing 44% of total tax revenue while accounting for only 1.7% of administrative costs (OECD, 2024).

- High net wealth individual: Targeted via behavioral analytics to predict non-compliance risks.

These changes compel tax authorities to rethink their approaches to compliance risk management and the nature and timing of traditional interventions. They must ensure tax laws and regulations particularly those governing data collection and usage evolve to address modern challenges and reflect the expectations of policymakers and citizens.

3. Conclusion

This study acknowledges that tax compliance risk management has evolved from traditional models to a data-driven ecosystem, driven by three transformative factors: (1) the adoption of digital technologies (big data, AI) for risk forecasting and automated interventions; (2) the integration of taxpayer behavioral insights into policy design; and (3) enhanced cross-border collaboration through standardized data protocols. Specifically, the shift to real-time interventions and the utilization of unstructured data have enabled tax authorities to detect 15–20% of multinational tax evasion cases while significantly reducing administrative burdens (OECD, 2023). However, this success requires harmonization between flexible legal frameworks (enabling digital data collection/processing) and investments in technological capabilities. To sustain effectiveness, tax administrations must:

- Prioritize resource allocation for high-risk groups (e.g., large enterprises, high net wealth individual) based on quantitative risk analysis.

- Establish public-private partnerships to embed compliance into enterprise management systems.

- Standardize global data-sharing protocols, particularly in the rapidly evolving digital economy.

These findings provide a comprehensive overview of tax administration reforms and lay the groundwork for future research on balancing compliance efficiency and data privacy in the AI era.

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FACTORS AFFECTING BUSINESS PERFORMANCE: A STUDY OF VIETNAMESE LISTED PLASTIC INDUSTRY ENTERPRISES IN THE VIETNAMESE STOCK MARKET

PhD. Tran The Nu*

Abstract: ***The business performance of enterprises is influenced by numerous internal and external factors. This study investigates six internal factors and two external factors that impact the business performance of plastic industry enterprises listed on the Vietnamese stock market and proposes several solutions. The research team employs a panel data regression model using data from 48 plastic industry companies listed on the HOSE and HNX stock exchanges over the period 2015-2022. The results reveal that 5 out of the 8 factors analyzed have a significant impact on business performance, namely: company size, quick ratio, total asset turnover, debt-to-total assets ratio, and business age.***

• Keywords: *plastic industry firms, financial performance, factors influencing business performance.*

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1. General Introduction

The plastic industry is vital to Vietnam's economy, driven by demand from construction, automotive, consumer goods, and packaging sectors. It contributes significantly to exports and employment, with steady growth over the past decade, according to the Vietnam Plastics Association (VPA).

However, the industry faces challenges such as intense international competition, rising raw material costs, and strict environmental regulations. These pressures force firms to improve performance, optimize resources, and enhance competitiveness. While studies on business performance in sectors like real estate, finance, and manufacturing are abundant, research specific to the plastic industry remains limited. Existing studies (Saeed et al., 2013; Hoàng, 2023) focus on factors like firm size, liquidity, and debt ratio but overlook the sector's unique challenges, such as raw material reliance and high operational costs. Research on the Vietnamese plastic industry, particularly during the period 2015-2022, is also scarce. This study aims to fill this gap by analyzing factors influencing the performance of listed plastic firms in Vietnam. Using econometric methods, it explores relationships between key variables, such as firm size, liquidity, financial leverage, asset turnover, and macroeconomic factors like GDP growth and inflation. The findings will provide practical recommendations for improving financial and operational performance and enhancing competitiveness in a challenging market.

The paper is structured as follows: Section 2 reviews the literature and theoretical framework; Section 3 outlines the research model and methodology; Section 4 presents empirical results; Section 5 concludes with recommendations for policymakers and business practitioners.

2. Literature Review

Numerous studies have explored the factors influencing business performance across various industries. Saeed et al. (2013) used multiple regression models to examine performance indicators like Return on Assets (ROA), Return on Equity (ROE), and Earnings Per Share (EPS). Their findings indicated that company size, short-term debt ratio, and total debt positively impact these indicators, while long-term debt has a negative effect. Interestingly, asset growth rate did not show a significant influence. Hoàng (2023) extended this research to the Vietnamese real estate sector, identifying five key factors-liquidity ratio, operational efficiency, debt ratio, company size, and cost ratio-that significantly affect business performance, while three other factors, including growth rate and fixed asset ratio, were not statistically significant.

These findings are consistent with earlier studies that emphasize the positive role of company size in enhancing operational performance. Saeed et al. (2013) reaffirmed that larger firms benefit from increased growth opportunities, leading to improved competitiveness. Furthermore, liquidity levels were found to positively correlate with financial performance,

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with firms holding higher liquidity exhibiting better efficiency and profitability.

The literature also highlights the importance of growth opportunities and firm age. Zeitun and Tian (2007) suggested that companies with greater growth potential tend to perform better, as they can generate higher profits from their investments. Kipesha (2013) further argued that a company's age, which reflects managerial experience, can enhance performance through better decision-making and operational expertise. However, aging firms may face challenges, such as reduced agility or resistance to change, which can impede performance.

Macroeconomic factors have also been examined for their influence on business performance. Anande-Kur et al. (2020) found a positive relationship between GDP growth and profitability, indicating that a thriving economy benefits firms across sectors. On the other hand, Syafri (2012) showed that inflation negatively impacts profitability, as it makes it harder for businesses to raise capital and can discourage debt financing due to rising costs.

More recently, Nguyen Anh Tuan & Tran The Nu (2022) explored the Vietnamese construction sector, identifying key factors such as operating profit margin, growth rate, capital structure, and business age that significantly affect performance. While the research across these industries provides valuable insights, there is a notable gap when it comes to the plastic sector, particularly in the context of Vietnam's economy between 2015 and 2022. This study aims to fill this gap by specifically examining the internal and external factors influencing the business performance of plastic industry enterprises in Vietnam.

3. Research Model and Methodology

Based on the review of existing studies, the research team has developed the following hypotheses and research model:

Hypothesis H1: Company size has a positive impact on business performance.

Hypothesis H2: Revenue growth has a positive impact on business performance.

Hypothesis H3: Quick ratio (liquidity) has a positive impact on business performance.

Hypothesis H4: Total asset turnover has a positive impact on business performance.

Hypothesis H5: Financial leverage has a negative impact on business performance.

Hypothesis H6: Business age has a positive impact on business performance.

Hypothesis H7: GDP has a positive impact on business performance.

Hypothesis H8: Inflation has a negative impact on business performance.

Research Model:

$$ROIC_{it} = \beta_0 + \beta_1 SM_{it} + \beta_2 TM_{it} + \beta_3 LEV_{it} + \beta_4 GDP_{it} + \beta_5 CPI_{it} + \beta_6 SIZE_{it} + \beta_7 AGE_{it} + \beta_8 GROWTH_{it} + e$$

In this model:

ROIC (Return on Invested Capital) is the dependent variable that measures the performance of the company.

ßi are the coefficients of the respective independent variables.

The independent variables are as follows:

SM (Quick Ratio): A liquidity ratio that measures a company's ability to meet its short-term obligations using its most liquid assets.

TM (Total Asset Turnover): A measure of a company's efficiency in using its assets to generate revenue.

LEV (Debt-to-Total Assets Ratio): A financial leverage ratio that indicates the proportion of a company's assets that are financed through debt.

GDP: Gross Domestic Product, representing the economic growth rate of the country.

CPI: Consumer Price Index, which is used to measure inflation.

SIZE: Company size, typically measured by total assets or revenue.

AGE: The number of years a company has been in operation.

GROWTH: Revenue growth, indicating the year-over-year growth rate of the company's revenue.

Based on the research results, the author has constructed measurement scales for the variables in the model, which are summarized in the table below:

Table 1. Summary of the measurement scales for the research variables

Variable	Measurement Scale	Variable code	Source
Performance	Pre-Tax Profit / Invested Capital (Invested Capital = Debt + Equity - Cash and Cash Equivalents)	ROIC	Robert Higgin (2012)
Company Size	Natural logarithm of total assets	SIZE	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013), (Hoàng, 2023), (Nguyen Anh Tuan & Tran The Nu, 2022)
Revenue Growth	= (Revenue in the current year - Revenue in the previous year) / Revenue in the previous year	GROWTH	(Zeitun & Tian, 2007)
Quick Ratio	= (Current Assets - Inventory) / Current Liabilities	SM	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013),
Total Asset Turnover	= Revenue / Average Total Assets	TM	(Saeed, M. M., Gull, A. A., & Rasheed, M. Y., 2013), (Ding Hua and Sha Rui , 2011)
Financial Leverage	= Total Debt / Total Assets	LEV	(Konarasinghe, W. G. S., & Pathirawasam, C, 2013)

Variable	Measurement Scale	Variable code	Source
Business Age	= Number of years from establishment to the year of the study	AGE	(Kipesha, 2013)
Macroeconomic Growth and Development	= The growth (decrease) rate of GDP in the current year compared to the previous year	GDP	(Anande-Kur, F., Faajir, A., & Agbo, A, 2020)
Inflation	Measured by the Consumer Price Index (CPI)	CPI	(Syafri., 2012)

This study focuses on publicly listed plastic industry firms in Vietnam from 2015 to 2022. Financial data was collected from sources like Vietstock.vn and Fiintrade.vn. The research model includes 9 variables (8 independent and 1 dependent), requiring a minimum sample size of 114. To ensure representativeness and enhance credibility, the study uses a sample of 384 observations from 48 plastic companies listed on the HOSE and HNX exchanges.

4. Research Results

4.1. Descriptive Statistics

The statistical data for the financial indicators are presented in Table 2, which includes the following: mean value, standard deviation, minimum value, and maximum value.

Table 2. Descriptive Statistics Results

Variable	Obs	Mean	Std. Dev.	Min	Max
ROIC	384	0.1042092	0.1025527	-0.1944641	0.6160003
SIZE	384	8.646943	1.699691	0	10.9046
GROWTH	384	0.1869485	0.6665698	-0.7614212	2.735022
SM	384	1.609167	1.613906	0	9.670999
TM	384	1.509083	1.7777	0	13.83561
LEV	384	0.4068783	0.2076347	0	0.8641241
AGE	384	31.58594	20.97251	0	115
GDP	384	5.91375	1.894385	2.58	8.02
CPI	384	2.5425	1.093794	0.63	3.54

The descriptive statistics table for the research variables includes 48 plastic industry enterprises listed on the stock exchanges, corresponding to 384 observations, covering the period from 2015 to 2022.

4.2. Correlation Analysis

Table 3. Autocorrelation Matrix Results

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ROIC	1.000								
(2) SIZE	0.142	1.000							
(3) GROWTH	-0.004	0.073	1.000						
(4) SM	0.403	0.094	-0.091	1.000					
(5) TM	0.360	0.020	-0.017	0.095	1.000				
(6) LEV	-0.330	0.399	0.158	-0.581	-0.052	1.000			
(7) AGE	0.184	0.239	-0.112	0.072	-0.115	-0.088	1.000		
(8) GDP	-0.007	-0.067	0.029	0.009	0.008	-0.001	-0.032	1.000	
(9) CPI	-0.063	0.117	0.043	0.030	0.001	0.085	0.018	0.356	1.000

The authors checked the correlations between variables, noting that all correlation coefficients were below 0.80, with the highest at 0.581 between LEV and SM, indicating no multicollinearity. However, to confirm this, they conducted a Variance Inflation Factor (VIF) test using Stata 17 software to further assess multicollinearity.

Table 4. Multicollinearity Test Results

Variable	VIF	1/VIF
LEV	2.35	0.425357
SM	1.91	0.524575
SIZE	1.67	0.599451
CPI	1.18	0.850025
GDP	1.16	0.860366
AGE	1.16	0.862567
GROWTH	1.04	0.961543
TM	1.03	0.972715
Mean	VIF	1.44

The results of the multicollinearity test reveal that the highest VIF value is 2.35 (less than 10), indicating that the research model is free from multicollinearity issues.

4.3. Regression Results

To examine the factors affecting the business performance of plastic industry enterprises, the authors used three regression models: OLS (Ordinary Least Squares), FEM (Fixed Effects Model), and REM (Random Effects Model) to analyze the panel data. The results are presented below:

Table 5. Regression Results using OLS, FEM and REM Models

Variable	Pooled-OLS	FEM	REM
	ROIC		
SIZE	0.012***	0.007	0.006*
	(0.000)	(0.107)	(0.089)
GROWTH	0.010	0.011**	0.011**
	(0.118)	(0.03)	(0.034)
SM	0.012***	0.018***	0.018***
	(0.001)	(0.000)	(0.000)
TM	0.020***	0.009	0.014***
	(0.000)	(0.124)	(0.001)
LEV	-0.132***	-0.074	-0.082**
	(0.000)	(0.101)	(0.035)
AGE	0.001***	-0.002	0.001
	(0.001)	(0.156)	(0.233)
GDP	0.002	0.000	0.001
	(0.434)	(0.908)	(0.412)
CPI	-0.008*	-0.006**	-0.001**
	(0.056)	(0.044)	(0.010)

**** p<0.01, ** p<0.05, * p<0.1*

The table shows the regression results for the OLS, FEM, and REM models with the independent variable ROIC (Earnings Before Tax / Invested Capital). After comparing and selecting the appropriate model, the study will perform tests for that model.

The OLS regression results show that SIZE, SM, TM, and AGE positively impact ROIC, with significance at 1%. LEV and CPI have a negative relationship with ROIC, significant at 1% and 5%, respectively. GROWTH and GDP are positively related to ROIC but lack statistical significance.

In comparison, the FEM model indicates that Revenue Growth (GROWTH), Quick Ratio (SM), and Inflation (CPI) significantly affect ROIC, with significance at 5%, 1%, and 5%, respectively.

GROWTH and SM have a positive effect, while CPI has a negative one.

The REM model shows that six variables-SIZE, GROWTH, SM, TM, LEV, and CPI-are significant. SIZE, GROWTH, SM, and TM have a positive effect, while LEV and CPI have a negative impact on ROIC.

Selection between the OLS model and the FEM model:

To select the appropriate model between the OLS and FEM models, the study uses an F-test with the following hypotheses:

H_0: The OLS model is more appropriate than the FEM model.

H_1: The FEM model is more appropriate than the OLS model.

Since the p-value = 0.0000 < 5%, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. Through the F-test, we conclude that the FEM model is the more appropriate model.

Selection between the REM model and the FEM model:

The study used the Hausman test to choose between the REM model and the FEM model, with the following hypotheses:

H_0: The REM model is more appropriate than the FEM model.

H_1: The FEM model is more appropriate than the REM model.

Since the p-value = 0.3575 > 5%, the null hypothesis (H_0) is not rejected, and the alternative hypothesis (H_1) is rejected. Therefore, the study chooses the REM model as the more appropriate model.

Table 6. Hausman Test for Model Selection

Hausman (1978) specification test

	Coef.
Chi-square test value	8.82
P-value	0.3575

Conclusion: Among the three models OLS, FEM, and REM after using the F-test, it was found that the FEM estimates are more appropriate than the OLS estimates. Following the Hausman test, it was concluded that the REM estimates are more appropriate than the FEM estimates. Therefore, the REM model is the most suitable model for studying the impact of various factors on business performance, measured by the ROIC (Earnings Before Tax / Invested Capital) ratio.

Next, the authors will test whether the REM model exhibits any issues, such as multicollinearity, heteroscedasticity, and autocorrelation. Afterward, the study will conduct regression using the GLS model to address these potential issues.

Testing the Model for Issues:

To test for autocorrelation between the variables in the model, the authors used the Wooldridge Test with the following hypotheses:

H_0: The REM model does not exhibit autocorrelation.

H_1: The REM model exhibits autocorrelation.

Table 7. Wooldridge Test Results

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

F(1, 47) = 8.965

Prob > F = 0.0044

The **Prob > F** coefficient = 0.0044 < 5%, so the null hypothesis (H_0) is rejected. Through this test, it is determined that the model exhibits autocorrelation.

Heteroscedasticity occurs when the errors in the regression equation, estimated from the sample observations of the independent and dependent variables, change according to a certain pattern. The Breusch-Pagan test is used to check whether the REM model exhibits heteroscedasticity with the following hypotheses:

H_0: The REM model does not exhibit heteroscedasticity.

H_1: The REM model exhibits heteroscedasticity.

Table 8. Breusch-Pagan Test Results

Breusch and Pagan Lagrangian multiplier test for random effects

ROIC[NAME, t] = Xb + u[NAME] + e[NAME,t]

Estimated results:

	Var	SD = sqrt(Var)
ROIC	0.010517	0.1025527
e	0.0034136	0.0584261
u	0.0039289	0.0626813

Test: Var(u) = 0

chibar2(01) = 321.28

Prob > chibar2 = 0.0000

The **Prob > chi²** coefficient = 0.0000 < 5%, so the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. The study shows that the REM model exhibits heteroscedasticity.

Correcting the REM model using the GLS method.

Table 9. GLS Model Regression Results

ROIC	Coef.	St.Err.	t-value	p-value	[95% conf.	interval]	Sig
SIZE	0.0046	0.0008	6.08	0.000	0.003	0.006	***
GROWTH	0.0019	0.0021	0.87	0.385	-0.002	0.006	
SM	0.0077	0.0015	5.11	0.000	0.005	0.0107	***
TM	0.0194	0.003	6.36	0.000	0.013	0.0253	***
LEV	-0.057	0.0073	-7.81	0.000	-0.071	-0.0427	***
AGE	0.0011	0.0001	7.09	0.000	0.000	0.0014	***
GDP	-0.0016	0.0005	-3.56	0.000	-0.003	-0.0007	***
CPI	-0.0004	0.0008	-0.50	0.618	-0.002	0.001	
Constant	0.0077	0.0047	1.66	0.097	-0.001	0.0169	

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The table shows the results of correcting the issues in the REM model using the GLS method, after selecting the appropriate model and testing for defects in the model.

After addressing the issues in the model, the results show that six variables have a positive impact on the dependent variable ROIC: SIZE, SM, TM, LEV, AGE, and GDP. These variables are all statistically significant at the 1% level. The remaining two variables, GROWTH and CPI, are not statistically significant in the model.

4.5. Conclusion of Hypotheses Based on the Regression Model Analysis Results

Based on the estimation results, the regression model measures the extent to which various factors impact the ROIC index of companies in the plastic industry as follows:

$$ROIC = 0.0077 + 0.0046*SIZE + 0.0077*SM + 0.0194*TM - 0.057*LEV + 0.0011*AGE - 0.0016*GDP + e$$

The results show that financial leverage has the strongest negative impact on ROIC: as debt increases, ROIC decreases. This aligns with findings from Omondi & Muturi (2013), Bouraoui and Louri (2014), and Faisal Mahmood et al. (2019). Asset turnover also plays a significant role: higher turnover improves asset utilization, enhancing performance, consistent with Trương Đông Lộc and Nguyen Đuc Trong (2010), Ding and Sha (2011), and Seema et al. (2011). The liquidity ratio positively affects business performance, as higher liquidity helps cover fixed costs, improving profitability.

Company size has a positive impact on ROIC, suggesting that expanding business scale could improve profitability. Business age also matters: older companies find it easier to raise capital, reducing the cost of capital and boosting efficiency.

Finally, GDP negatively impacts business performance, contradicting some studies (Ray & Keith, 1995; Ma, 2011; Engin et al., 2011). This may be due to increased consumer demand for low-cost goods in a weak economy, benefiting certain companies. However, in other cases, rising GDP may not lead to better performance due to factors like increased competition or higher costs.

Conclusion: Based on the above results, the following conclusions can be drawn:

Table 10. Summary of Research Results

Hypothesis	Kết luận
H1: Company size has a positive impact on business performance..	Accepted
H2: Revenue growth has a positive impact on business performance.	Rejected
H3: Liquidity ratio has a positive impact on business performance.	Accepted
H4: Asset turnover has a positive impact on business performance.	Accepted
H5: Debt ratio to total assets has a negative impact on business performance.	Accepted
H6: Company age has a positive impact on business performance.	Accepted
H7: GDP có ảnh hưởng tích cực tới HQKD của DN.	Rejected
H8: Inflation has a negative impact on business performance.	Rejected

5. Conclusion

Based on the actual financial situation of listed plastic companies in Vietnam and the regression analysis to measure the impact of various factors on business performance, the author provides several recommendations for listed plastic companies to improve their financial situation as follows:

The research findings indicate a positive relationship between company size, liquidity ratio, and asset turnover and business performance. Therefore, expanding the company's scale is a strategy that helps strengthen the company's competitive position in the market while also potentially improving business performance. In addition, companies need to regularly monitor and update their payment situation and reconcile their debts. To ensure flexibility in paying upcoming debts, companies should have a reasonable debt management mechanism and set aside enough cash reserves to meet imminent loan repayments. Besides the upcoming debt obligations, companies must also be aware of risks from creditors who may demand immediate payment. Hence, maintaining adequate cash reserves for payment is essential. To quickly convert to cash when needed, companies can hold high-liquidity securities to ensure the payment of short-term liabilities. Additionally, managers should focus on increasing asset turnover to drive business performance.

The research also reveals that financial leverage negatively affects business performance. Therefore, companies should consider leveraging investment funds from existing shareholders, employees within the company, strategic partners, or new investors by issuing stocks. This is an effective form of capital raising as it allows for long-term use of funds without facing debt repayment pressure or interest costs, and it can be utilized for long-term investment projects.

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EFFECT OF TAX KNOWLEDGE ON INDIVIDUAL TAXPAYERS COMPLIANCE

PhD. To Van Tuan*

Abstract: ***The objective of the study is to analyze the impact of tax knowledge factors, including tax reporting knowledge, tax calculation knowledge, and tax payment knowledge, on personal tax compliance. Data were collected in Hai Phong City through 326 valid survey questionnaires, which were subjected to quantitative analysis using SPSS software and the OLS regression analysis method. The research results showed that all three factors related to tax knowledge significantly impact personal income tax compliance behavior. The study also provides implications for improving tax awareness among individuals, thereby enhancing personal income tax compliance among the people of Hai Phong in particular and the nation as a whole in the future.***

• Keywords: *tax knowledge, tax compliance, taxpayer.*

JEL codes: H24, H26

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1. Introduction

Personal tax compliance is a fundamental component of modern fiscal systems, reflecting how well individuals adhere to tax laws and meet their tax obligations. Non-compliance, in the form of tax evasion or avoidance, can significantly erode government revenues and hinder public services. As economies become increasingly interconnected, the issue of personal tax compliance has gained prominence due to the rise of global labor mobility, complex tax structures, and the digitalization of financial transactions. Understanding the factors that influence individual tax compliance is essential for governments, tax authorities, and policymakers to design effective tax regimes and enforcement mechanisms. This paper explores the growing issue of personal tax compliance, the challenges it presents, and the broader implications of ensuring high levels of compliance for economic stability and equity.

The growing complexity of personal tax systems, coupled with increasing opportunities for individuals to exploit cross-border tax loopholes, has heightened the challenges surrounding tax compliance. Globalization has enabled individuals to hold assets and earn income in multiple jurisdictions, complicating the enforcement of national tax laws. Moreover, the rise of the gig economy and the digitalization of financial assets, such as cryptocurrencies, has further blurred the lines of tax accountability. As these challenges escalate, the need for adaptive and comprehensive personal tax compliance strategies becomes more urgent.

This study investigates the key factors that affect personal tax compliance, which is tax knowledge including Tax reporting knowledge, Tax calculation knowledge, Tax payment knowledge. By examining these factors, policymakers can design tax systems that encourage voluntary compliance, minimize revenue losses, and promote a sense of fairness and equity in the broader society.

In addition to the introduction presented above, the rest of the study is presented as follows: In the next part, the study conducts an overview of previous studies, then the study proceeds data collection and present research methods. Next, the study analyzes the results, discusses the results and draws general conclusions.

2. Literature review

According to Pangestu & Rusmana (2012) define tax compliance as the disciplined behavior of taxpayers in fulfilling both their rights and obligations in line with applicable tax laws and procedures. In general, tax compliance can be understood as adherence to all tax-related regulations. Pangestu & Rusmana (2012) identified two types of tax compliance: formal and material compliance. Formal compliance refers to a situation where taxpayers meet their tax obligations strictly

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according to the procedural requirements of the Tax Act. Material compliance, on the other hand, is characterized by taxpayers substantively fulfilling all tax obligations in line with the essence and intent of the Tax Law. They further explain that when taxpayers submit their tax returns (SPT) and pay the due tax on time, they meet the criteria for formal compliance. Conversely, material compliance is achieved when taxpayers complete their tax returns accurately, truthfully, and in accordance with the Tax Act. In their research on tax compliance related to future value-added tax (VAT) returns, Pangestu & Rusmana (2012) used instruments to assess both formal and material compliance, specifically focusing on the timely submission of VAT returns, timely payment of owed VAT, and on-time VAT payments.

Tax knowledge and the complexity of tax collection are recognized as key factors contributing to taxpayer non-compliance. Research by Saad (2013) in Malaysia revealed that respondents lacked sufficient technical knowledge about taxes and perceived the tax system as overly complex, both of which contributed to non-compliant behavior among taxpayers. Similarly, Palil (2010), indicated that improving taxpayers' understanding of tax laws could positively influence their attitudes toward compliance and improve their overall behavior in adhering to tax regulations.

Nasir (2010) conducted a study to investigate the impact of tax knowledge and the tax administration system on taxpayer compliance, focusing on land and building tax payers at KPP Pratama Jakarta Pasar Rebo. His findings indicated that both tax knowledge and the effectiveness of the tax administration system had a positive and significant influence on taxpayer compliance. Adiasa (2013) researched the effect of understanding tax regulations on compliance, using risk preferences as a moderating variable, with individual taxpayers in West Semarang as the sample. The results showed that comprehension of tax laws positively impacted compliance, while risk preferences did not moderate the relationship between tax understanding and compliance. Saad (2013) explored taxpayers' knowledge and their perceptions of the complexity of the income tax system, as well as reasons for non-compliance, finding that insufficient technical knowledge and the complexity of the tax system contributed to non-compliance. In a separate study, Palil (2010) examined individual taxpayers in Malaysia, using variables such as knowledge of rights and obligations in tax reporting, understanding of taxable income, and awareness of tax allowances. The results demonstrated that these factors significantly influenced tax compliance.

Stone et al. (2023) examined the influence of advice shared within online tax communities on taxpayer decision-making. These communities, often linked to major tax preparation software, allowed taxpayers to ask specific questions and receive responses. Although the intention was to provide unbiased advice, the quality, content, and expertise of responses varied significantly. Utilizing expectancy violations theory (EVT), we focused on two key aspects of the advice provided: the expertise of the response provider and the concreteness of the language used. Our findings suggested that taxpayers reported more conservatively when advice from a recognized tax expert was conveyed using concrete language, while abstract language led to more aggressive reporting. Additionally, the perceived usefulness of the advice mediated this relationship.

3. Data and methodology

This study uses primary data collected in Hai Phong City in 2024. The study employed a convenient sampling method for individuals. According to Hair et al. (2006), an appropriately determined sample size requires at least five times the number of questions, corresponding to a minimum sample size of 90. In this study, 330 questionnaires were distributed, and 326 valid responses were received. Four invalid responses were excluded from the analysis.

Based on the previous studies, the estimated equation is shown as follows:

$$Y_t = \beta_0 + \beta_1 TR_t + \beta_2 TC_t + \beta_3 TP_t + \varepsilon_t$$

In which:

is the individual tax compliance behavior; is the the Tax reporting knowledge; is the Tax calculation knowledge; is the Tax payment knowledge.

The study uses the SPSS software for analysis as well as uses OLS regression, and then uses this research results to evaluate factors of knowledge affecting individual tax compliance.

4. Results

4.1. Descriptive statistics

Table 1 shows that the research sample has 326 individual respondents, including 102 people under

30 years old, 126 people between 31-39 years old and 98 people over 40 years old, accounting for 31.3%, 38.7% and 30.0%, respectively.

Table 1. Range of respondents' age

Respondents		Number	Percentage
Age	Under 30	102	31.3%
	31 – 39	126	38.7%
	Over 40	98	30.0%

Source: Authors' analysis

4.2. Cronbach's alpha analysis

Table 2. Reliability of scale

Variable	Number of items	Cronbach's alpha
TR	4	0.831
TC	4	0.840
TP	4	0.762
Y	6	0.882

Source: Authors' analysis (2023)

Table 2 shows that the selected scales are appropriate because they have Cronbach's alpha coefficient greater than 0.6 and are satisfactory, therefore these scales are suitable for EFA analysis.

4.3. EFA analysis

Table 3. KMO and Barlett test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.774
Bartlett's Test of Sphericity	Approx. Chi-Square	2881.331
	Df.	153
	Sig.	0.000

Source: Authors' analysis

According to KMO and Barlett's test, the KMO coefficient reaches 0.774 and is greater than 0.5, and at the same time, Bartlett's Test of Sphericity shows that Sig. = 0.000, so the choice is appropriate. In addition, Table 4 also indicates the rotated component matrix as below:

Table 4. Rotated component matrix

Items	1	2	3
TR2	0.896		
TR4	0.885		
TR3	0.861		
TR1	0.841		
TC3		0.900	
TC4		0.851	
TC2		0.817	
TC1		0.734	
TP3			0.894
TP1			0.811
TP2			0.740
TP4			0.562

Source: Authors' analysis

4.4. Correlation matrix

Table 5. Correlation matrix

Variable	Y	TR	TC	TP
Y	1.000			
TR	0.176	1.000		
TC	0.276	0.154	1.000	
TP	0.163	0.058	0.088	1.000

Source: Authors' analysis

Table 5 indicates that the highest correlation coefficient of 0.276 belongs to Y and TC and is still less than 0.8, so the possibility of multicollinearity is eliminated. Therefore, the selection of the variables is appropriate.

4.5. Regression results

Table 6. Regression results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.849	0.403		6.115	0.001
	TR	0.123	0.050	0.130	2.451	0.015
	TC	0.228	0.050	0.245	4.589	0.000
	TP	0.132	0.052	0.134	2.538	0.012

Source: Authors' analysis

Table 6 results reveal:

The estimated coefficients of TR, TC, and TP are all positive and statistically significant, with the largest estimated coefficient being TC, followed by TP, and finally TR, as detailed below:

The estimation results confirm the positive impact of TC (Tax Calculation knowledge) on individual tax compliance behavior, and this impact is the strongest. Specifically, an increase of 1 unit in TC has the potential to improve individual tax compliance behavior by an average of 0.245 units. Tax calculation knowledge positively influences personal tax compliance by reducing errors and enhancing individuals' understanding of their financial obligations. With this knowledge, taxpayers can navigate the system more effectively, leading to greater accuracy in reporting and fostering a stronger sense of trust in the tax process. It also minimizes perceptions of complexity, encourages timely compliance, and helps individuals avoid penalties. By making informed decisions about deductions and credits, taxpayers are more likely to comply with regulations, ultimately fostering higher levels of compliance.

The estimation results also confirm the positive impact of TP (Tax Payment knowledge) on individual tax compliance behavior, and this impact is the second strongest. Specifically, an increase of 1 unit in TP has the potential to improve individual tax compliance behavior by an average of 0.134 units. Tax payment knowledge positively influences personal tax compliance by ensuring individuals understand when, how, and how much they need to pay, reducing the likelihood of missed or incorrect payments. This knowledge fosters a sense of responsibility, minimizes confusion about payment processes, and helps avoid penalties for

late or incorrect payments. Additionally, a clear understanding of payment methods and deadlines promotes timely compliance, contributing to higher levels of overall tax adherence and trust in the system.

Finally, the estimation results confirm the positive impact of TR (Tax Reporting knowledge) on individual tax compliance behavior, and this impact is the third strongest. Specifically, an increase of 1 unit in TR has the potential to improve individual tax compliance behavior by an average of 0.130 units. Tax reporting knowledge positively influences personal tax compliance by equipping individuals with the skills needed to accurately complete and submit their tax returns. This understanding reduces errors and omissions, minimizing the risk of audits and penalties. With a clear grasp of reporting requirements, taxpayers are more likely to fulfill their obligations on time, fostering a sense of accountability. Furthermore, knowledgeable taxpayers are better able to identify and claim eligible deductions and credits, enhancing their compliance and overall trust in the tax system

5. Conclusion and implications

Empirical results show that all three types of tax knowledge, including tax reporting knowledge, tax calculation knowledge, and tax payment knowledge, positively affect personal tax compliance. Some practical implications for enhancing tax calculation knowledge, tax payment knowledge, and tax reporting knowledge to improve personal tax compliance can be proposed as follows:

5.1. Tax Calculation Knowledge

Educational Workshops: Implement community-based workshops or online webinars focused on tax calculation techniques, helping taxpayers understand how to compute their tax liabilities accurately. This could include practical examples and case studies.

Interactive Tools: Develop and promote user-friendly online calculators and mobile apps that allow taxpayers to practice calculating their taxes. These tools can provide immediate feedback and guidance, reinforcing learning.

Targeted Information Campaigns: Launch campaigns that focus on key tax calculation concepts, disseminating simplified guides and visual aids through social media, tax agencies, and local community centers to increase awareness and understanding.

5.2. Tax Payment Knowledge

Clear Communication of Payment Processes: Tax authorities should create detailed yet straightforward guides that outline payment methods, deadlines, and consequences of late payments, ensuring that information is accessible and easy to understand.

Reminders and Alerts: Implement automated reminder systems via email or SMS to notify taxpayers of upcoming payment deadlines and provide clear instructions on how to make payments.

Incentives for Timely Payments: Introduce incentives, such as discounts or rewards, for taxpayers who consistently make timely payments, thereby encouraging compliance through positive reinforcement.

5.3. Tax Reporting Knowledge

Simplified Reporting Resources: Develop comprehensive, user-friendly resources that break down the reporting process, including step-by-step guides and FAQs addressing common concerns or misconceptions about tax reporting.

Tax Preparation Assistance: Offer free or low-cost tax preparation services, particularly for low-income individuals, to guide taxpayers through the reporting process and enhance their understanding of the requirements.

Feedback Mechanisms: Establish channels for taxpayers to ask questions and receive answers regarding reporting issues. This could involve online forums, hotlines, or community tax clinics, fostering a supportive environment for learning and compliance.

By implementing these empirical implications, tax authorities can enhance taxpayers' knowledge in these key areas, ultimately leading to improved compliance rates.

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FACTORS AFFECTING THE EFFICIENCY OF VIETNAM'S JOINT STOCK COMMERCIAL BANKS

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Abstract: ***Five years after the National Assembly's Resolution 42/2017/QH14 on the settlement of credit institutions' bad debts and the Prime Minister's Decision 1058/QD-TTG approving a plan for credit institution restructuring, this study assesses the effectiveness of Vietnam's Joint Stock Commercial Banks (JSCBs). Using the Data Envelopment Analysis (DEA) technique, a quantitative method, this study evaluates the efficiency of 18 selected JSCBs in Vietnam between 2018 and 2022. It employs the Tobit model and Ordinary Least Squares (OLS) model to investigate the factors that affect efficiency. The findings demonstrate that, with an average technical efficiency index of 44.09%, banks underutilize their input resources between 2018 and 2022. To increase business efficiency, JSCBs in Vietnam should manage human resources, increase capital mobilized from deposits, and enhance income from credit activities. Furthermore, empirical data indicates that JSCBs can function more efficiently if their total assets and equity are increased, and their existing loan portfolio is reduced.***

• Keywords: *bank efficiency, data envelopment analysis, ordinary least squares, tobit.*

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1. Introduction

In the context of globalization, foreign banks, non-bank financial intermediaries, fintech companies, and mobile service providers are powerful organizations with a wide impact and are capable of competing in active markets. Meanwhile, Joint Stock Commercial Banks (JSCBs) in Vietnam are facing many challenges, including low profits, a high percentage of bad debts, poor asset quality, liquidity concerns, and the potential risk of a collapsed system, all of which affect the social and economic life, as well as the manufacturing and business activities of citizens and companies. Resolution 42/2017/QH14 of the National Assembly on the settlement of bad debts of credit institutions and Decision 1058/QD-TTG of the Prime Minister, approving a scheme for restructuring the credit institution system associated with the settlement of bad debts for the period of 2016-2020 (extended until 31/12/2023), were issued by the Vietnam National Assembly in an effort to address bad debts quickly and thoroughly. The effect of these regulations during 2018-2022 showed that JSCBs in Vietnam had an average non-performing loan (NPL) ratio of less than 3%. However, JSCBs also experienced slow profit growth, decreased non-interest revenue, a lower net profit margin, and difficulties in service activities and stock investments. Because of the different studied periods and space, many previous evaluations and recommendations are not suitable in reality (Duong et al., 2020; Nguyen, 2017; Nguyen, 2008). Before, some authors only evaluated the initial period implementing these regulations above. Therefore, the purpose of this study is to assess the business efficiency of eighteen JSCBs over a longer time span (2018-2022) utilizing the Data Envelopment Analysis (DEA) method and Tobit Regression model. The study's findings would suggest factors that have increased the bank's efficiency.

2. Literature review

Efficiency is a crucial component of the banking sector, and many studies have looked into the efficiency of commercial banks. Efficiency can be measured using two different methods: the non-parametric linear programming approach and the parametric stochastic frontier production function approach. The non-parametric linear programming approach, or DEA, is used in this work. Scale efficiency (SE), or a bank's capacity to optimize its operations relative to its size, is a crucial aspect of efficiency. The effect of SE on the overall technical efficiency (TE) of JSCBs has been the subject of numerous studies. In Indonesian Islamic banks, SE and technical inefficiencies has a statistically significant correlation (Havidz & Setiawan, 2015).

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Technical inefficiency of Islamic Banks (IBs) is demonstrated to be caused by scale inefficiency in banks in MENA countries (Abdul Rahman & Rosman, 2013). The primary factor contributing to the technical inefficiency of IBs in Malaysia is determined to be scale (Yildirim, 2015).

Because the products that banks offer their customers are intangible, choosing the right variables to gauge their economies of scale, efficiency, and performance is a difficult task (Olgu, 2007). The three main methodologies used in the literature are the Production, Value-Added, and Intermediation approaches, although there is no agreement on how to choose input and output variables.

The "two-stage" approach is employed to account for environmental influences. Using any of the frontier methods or the fiscal rates mentioned in the previous sections, effectiveness scores obtained in "stage one" of this approach are regressed on designated environmental elements in "stage two". In recent years, numerous studies have utilized the estimated results from the Data Envelopment Analysis (DEA) as a dependent variable in both OLS and Tobit models.

The dependent variables in the OLS model consist of the TE (based on the DEA technique) that was applied previously (Yudistira, 2004). Using the DEA approach and Tobit regression, the effectiveness of commercial banking sectors is examined in many areas with varied results of influenced factors (Hu et al., 2008; Pasiouras, 2008; Raphael, 2013). A research conducted in Vietnam evaluates the performance of thirty-two commercial banks during the time of restructuring (2001 - 2005) (Nguyen, 2008). The input variables of this study include the net fixed asset, expenses for employees, total mobilized capital from customers. Meanwhile, output variables consist of interest and other equivalent amounts, other revenues and equivalent. To assess the effectiveness of company operations, the authors integrate the Tobit regression model, parametric analysis, and nonparametric analysis. The results also show that commercial banks in the studied period wasted 26.4% of input variables. Besides, the bank's assets, loan-to-deposit ratio, profit rate, bad loan rate, total expense, and total revenue impacted the business efficiency of commercial banks. Another study uses a Tobit regression model in conjunction with the DEA 2-stage technique to assess 21 commercial banks. (Nguyen, 2017). The TE index of 94% supports the research findings, which show that commercial banks employed reasonably efficient input resources between 2011 and 2015. The result from the Tobit Regression model indicates that increased business numbers in addition to the profit rate per total assets, bad loans per total credit balance, and total assets positively affect the TE of JSCBs.

3. Methodology

This research carried out a thorough investigation in two stages to evaluate the effectiveness of joint stock commercial banks. The first stage involved analyzing the effectiveness of the entire sample of banks collected using the DEA method. Efficiency scores were estimated with R. In the second phase, the impact of several factors on joint stock commercial banks' efficiency was investigated using the Tobit regression model, building upon the findings from the first stage. Tobit analysis was performed with STATA 14.

4. Data and variables

4.1. Data

The study used information from the yearly reports along with financial statements of 18 Vietnam JSCBs during the five years of 2018-2022, including BIDV, Vietinbank, Vietcombank, Techcombank, VPbank, MBbank, ACB, MSB, SHB, Eximbank, NamAbank, KienLongbank, NCB, PGbank, BacAbank, HDbank, OCB, and ABbank.

4.2. Variables

Phase 1:

After closely reviewing the aforementioned material, the author chose to employ the intermediation technique, which is frequently employed by writers. The DEA approach used two input elements, staff count (X1) and customer deposit (X2), and two output variables, interest income (Y1) and non-interest income (Y2). Other publications endorsed the selection of the input and output (Hassan et al., 2009; International Monetary Fund (IMF), 2023; Mester, 1993; Siems, 1992; Singh et al., 2008; Yue, 1992).

The author used output variables derived from the input variables above to run the DEA model, as described above, detecting the overall efficiency (or TE), pure TE (PE), and SE. The TE drawn from the DEA model was assumed to be CRS. The drawn PE was assumed to be VRS, where TE $\leq$ PE. TE/PE equals the SE. If TE = PE, then SE = 1, indicating

that the operational scale has no effect on efficiency.

Phase 2:

A large body of literature suggests that a variety of factors can affect a bank's efficiency. Based on this research, the bank's efficiency affected by the GDP growth rate, the bank's overall asset size, equity to entire assets, bad debt ratio, and inflation rate was examined. We estimate the subsequent model:

$$TE_{it} = \beta_0 + \beta_1 BZ + \beta_2 ETA + \beta_3 LTA + \beta_4 NPL + \beta_5 INF + \beta_6 GDP + U_{it}$$

$$SE_{it} = \beta_0 + \beta_1 BZ + \beta_2 ETA + \beta_3 LTA + \beta_4 NPL + \beta_5 INF + \beta_6 GDP + U_{it}$$

Where:

TE_{it}: Bank technical efficiency, which is the outcome of Phase 1 of the DEA model.

SE_{it}: Scale efficiency of the bank which is calculated from TE and PE.

BZ: Logarithm of the Bank's total assets.

ETA: Equity/Total assets

LTA: The loan to total asset ratio (total outstanding loans/Total assets)

NPL: Non-performing loan ratio (total bad debt/ Total outstanding debt)

INF: Inflation rate (growth rate last year)

GDP: GDP growth rate (growth rate of the gross domestic product)

β_0 is constant and U_{it} is the error component, according to the normal distribution.

Except for the value of INF and GDP collected from data from the World Bank, other variables' values are collected from Financial statements.

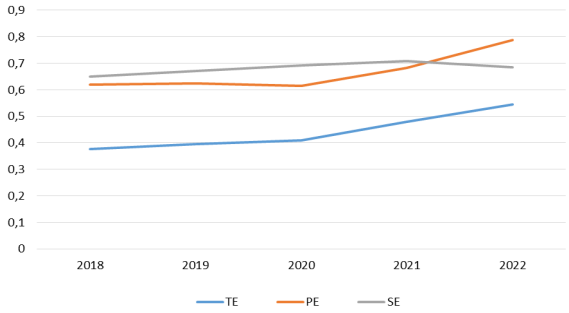
5. Empirical results

5.1. Phase 1: Bank Efficiency Measures

From 2018-2022, banks heavily rely on interest income, non-interest income tends to increase but still represents a relatively small proportion compared to interest income. To mitigate these risks, banks must explore alternative revenue sources and expand their offerings beyond traditional credit provision. By doing so, they can reduce their reliance on a single revenue stream and enhance their overall financial stability.

From 2018-2019, customer deposits experienced significant growth. However, the subsequent COVID-19 pandemic and the government's extended lockdown measures had a severe impact on customer deposits. The closure of businesses and companies, along with the stagnation of the tourism and export sectors, resulted in a decline in customer deposits. Many enterprises faced difficulties in mobilizing capital from customer deposits. Although there was a recovery in capital mobilization from customer deposits during 2021-2022, it remained lower than the pre-pandemic period. Because of the reduced deposit interest rates brought about by the State Bank of Vietnam's directive to lower lending rates to support economic recovery, customers do not prefer to put their money in banks.

Figure 1. Mean efficiency estimates of joint stock commercial banks



The average value of the TE points does not change with scale, but it varies according to the scale phase from 2018 to 2022, with the highest efficiency point being 1.000 (Figure 1).This means that among 18 sampled banks, there exists some banks with the highest efficiency and achieve minimum input and output optimization. Moreover, there are banks with low efficiency; the smallest efficiency point in the SE model is 0.192; whereas it is 0.161 (in the VRS model); and it is 0.149 (in the CRS model). These results indicate the differences in effectiveness between the investigated banks, with similar levels of output quantity, but some banks utilize minimum input optimization while others waste inputs.

The majority of Vietnam's JSCBs have been doing their business inefficiently between 2018 and 2020. Their lowest TE compared to PE and SE and their sharp rise to 54.56% in 2022 are indicators of this. This suggests that the ineffectiveness of Vietnam's JSCBs is more directly linked to their poor use of input resources than to the size of their business.

5.2. Phase 2: Influence factor of the efficiency

Correlation testing

The correlation between variables is detected using correlation testing, where the correlation coefficient runs from -1 to 1 referring to the

correlation's level between variables. The closer the value is to 1, the stronger the correlation, and if it equals 1, there is an absolute correlation relationship. The results show that the correlation coefficients between variables are all non-zero. Therefore, the variables in the research model are correlated.

Table 1: Correlation matrix

	TE	SE	BZ	ETA	LTA	NPL	GDP	INF
TE	1.000							
SE	0.735	1.000						
BZ	0.559	0.824	1.000					
ETA	0.449	0.264	-0.047	1.000				
LTA	-0.089	0.056	0.201	0.073	1.000			
NPL	-0.110	-0.266	-0.261	0.001	-0.113	1.000		
GDP	0.011	-0.056	-0.038	-0.003	0.011	0.105	1.000	
INF	-0.093	-0.055	-0.073	-0.054	-0.007	0.065	0.555	1.000

Source: Financial statements 2018 - 2022 and results from Stata 14 software

Multicollinearity test

The assessment of the variance inflation factor (VIF) 's aim is the investigation of the multicollinearity phenomenon. The max value of the VIF factor was 1.46 and the average value was 1.2, all of the VIF values in the test findings are less than 2, which suggests that multicollinearity was not present in this investigation**.**

Table 2: Description of the multicollinearity test

Variable	VIF	1/VIF
GDP	1.46	0.685375
INF	1.46	0.685859
BZ	1.12	0.894427
NPL	1.09	0.918599
LTA	1.05	0.948313
ETA	1.01	0.986302
Mean VIF	1.2	

Source: Financial statements 2018 - 2022 and results from Stata 14 software

OLS Regression Results

Table 3: OLS Regression Results for the dependent variable TE

Number of obs =	90	R^2 =	0.6042
F =	21.11	Adjusted R^2 =	0.5756
Prob > F =	0.0000	=	0.14567

TE	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BZ	0.1315027	0.0150655	8.73	0.000	0.1015381	0.1614673
ETA	0.0350756	0.0049396	7.1	0.000	0.025251	0.0449002
LTA	-0.0047614	0.0013432	-3.54	0.001	-0.0074329	-0.0020899
NPL	0.0028456	0.0085141	0.33	0.739	-0.0140887	0.0197799
INF	-0.0239585	0.031646	-0.76	0.451	-0.086901	0.038984
GDP	0.0066187	0.007684	0.86	0.392	-0.0086644	0.0219019
_cons	-1.178477	0.2205126	-5.34	0.000	-1.617068	-0.7398863

Source: Financial statements 2018 - 2022 and results from Stata 14 software

Table 4: OLS Regression Results for the dependent variable SE

Number of obs =	90	R^2 =	0.7952
F =	53.72	Adjusted R^2 =	0.7804
Prob > F =	0.0000	=	0.1249

SE	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BZ	0.2102253	0.012918	16.27	0.000	0.184532	0.2359187
ETA	0.0269117	0.0042355	6.35	0.000	0.0184875	0.0353359
LTA	-0.0032713	0.0011517	-2.84	0.006	-0.005562	-0.0009806
NPL	-0.0082447	0.0073005	-1.13	0.262	-0.0227651	0.0062757
INF	0.0233048	0.027135	0.86	0.393	-0.0306656	0.0772752
GDP	-0.0047392	0.0065887	-0.72	0.474	-0.0178439	0.0083654
_cons	-1.997705	0.1890797	-10.57	0.000	-2.373777	-1.621633

Source: Financial statements 2018 - 2022 results from Stata 14 software

Tobit Regression Results

Table 5: Tobit Regression Results for the dependent variable TE

Number of obs =	90	LR chi2=	79.87
Log likelihood =	35.066773	Prob > chi2 =	0.0000
		Pseudo R2 =	8.2063

TE	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BZ	0.133942	0.0152769	8.77	0.000	0.1035623	0.1643218
ETA	0.0367447	0.0050658	7.25	0.000	0.0266708	0.0468186
LTA	-0.0047275	0.0013585	-3.48	0.001	-0.0074291	-0.0020259
NPL	0.003895	0.0086303	0.45	0.653	-0.0132673	0.0210573
INF	-0.0255799	0.0320549	-0.8	0.427	-0.0893245	0.0381647
GDP	0.0072326	0.0077835	0.93	0.355	-0.0082458	0.0227109
_cons	-1.222549	0.2239425	-5.46	0.000	-1.667884	-0.7772152
/ sigma	0.1472951	0.0115148			0.1243967	0.1701935

Source: Financial statements 2018 - 2022 and results from Stata 14 software

Table 6: Tobit Regression Results for the dependent variable SE

Number of obs =	90	LR chi2 =	138.75
Log likelihood =	52.122741	Prob > chi2 =	0.0000
		Pseudo R2 =	4.0209

SE	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
BZ	0.2142311	0.0129666	16.52	0.000	0.1884457	0.2400166
ETA	0.0296577	0.004382	6.77	0.000	0.0209436	0.0383717
LTA	-0.00323	0.0011476	-2.81	0.006	-0.0055122	-0.0009478
NPL	-0.0066939	0.007314	-0.92	0.363	-0.0212386	0.0078507
INF	0.0207135	0.0271346	0.76	0.447	-0.0332466	0.0746736
GDP	-0.0037293	0.0065929	-0.57	0.573	-0.0168399	0.0093814
_cons	-2.069375	0.1905703	-10.86	0.000	-2.448345	-1.690405
/ sigma	0.124394	0.0096067			0.10529	0.143498

Source: Financial statements 2018 - 2022 and results from Stata 14 software

The analytical results show that technical and scale efficiency is positively and statistically significantly impacted by a bank's entire assets (BZ) size below the 1% threshold. To be more precise, a one-unit increase in entire assets causes a rise of 0.1315 units (OLS) and 0.1339 units (Tobit) increased technical efficiency, as well as a rise in scale efficiency of 0.2102 units (OLS) and 0.2142 units (Tobit) (Table 3 - 6). As a result, banks with adequate capital also have higher levels of technological and scale efficiency.

The ETA also positively and statistically significantly affects technical and scale efficiency below the 1% threshold. TE increases by 0.0350 units (OLS) and 0.0367 units (Tobit) for every unit rise in the equity to entire assets ratio; scale efficiency increases by 0.0269 units (OLS) and 0.0296 units (Tobit) for every unit increase in equity to entire

assets. Because commercial banks' inherent capital is tiny compared to their asset size, it should neglect the effect of ETA on technical and scale efficiency. For banks with a safe capital ratio according to international standards, capital can be increased in the short term to enhance liquidity, asset quality, and ensure stable development, and gradually increase market share, contributing to improving operational effectiveness.

In both models, LTA has a significantly negative correlation with TE and SE at the 1% level. A one-unit increase in the loan-to-asset ratio causes a drop in TE of 0,00476 units (OLS) and 0,0472 units (Tobit), and a one-unit increase in the loan-to-asset ratio results in a reduction in scale efficiency of 0.00327 (OLS) and 0.00323 (Tobit) units. The findings indicate that increasing bank lending is not always a more effective strategy. The danger of credit rises in tandem with credit amount. Since long-term loans are particularly susceptible to market and economic volatility, they frequently entail high amounts of risk. In reality, commercial banks have been expanding their credit market, leading to a more lenient assessment of loan projects. However, their ability to manage and control credit quality is still limited, with limited analysis and evaluation of credit portfolio projects. This has resulted in higher risk in lending, reduced capital utilization efficiency, increased overdue debt ratio, and posed risks to the overall system. The research reveals no significant impact of NPL, INF, and GDP on technical and scale efficiency during the period of 2018-2022.

6. Conclusion and recommendations

This paper uses the DEA method to measure the efficiency of 18 JSCBs from 2018 to 2022. To investigate the determinants of efficiency, we then use the OLS and Tobit models. We find that the majority of Vietnam's JSCBs have clearly been operating inefficiently between 2018 and 2020, and their inefficiency is more directly linked to the poor use of input resources than to the size of their business. The size of a bank's total assets, the equity-to-assets ratio, and the loans-to-assets ratio are all associated with bank efficiency. However, the growth rate of GDP, the non-performing loan ratio, and the inflation rate are not significantly related to bank efficiency. The research shows that expanding the scale of assets, increasing capital ownership, and managing credit portfolios to mitigate risks can improve the efficiency of commercial banks.

Although there is a correlation, it has little effect on banks' overall technical efficiency. Therefore, banks with significant total assets must exercise caution when deciding to increase their capital and expand their operations. It is evident that excess capital infusion may lead to a decrease in overall efficiency. In addition, it is crucial for Vietnamese credit institutions to be cautious when increasing their capital ownership. Effective capital management policies are necessary to ensure the optimal utilization of resources. By implementing efficient capital management strategies, credit institutions can maximize the benefits of increased capital while minimizing potential drawbacks.

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CAPITAL FORMATION OF JOINT STOCK COMMERCIAL BANK FOR INVESTMENT AND DEVELOPMENT OF VIETNAM - CURRENT SITUATION AND RECOMMENDATIONS

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Abstract: ***This study aims to evaluate the capital formation situation of Joint Stock Commercial Bank for Investment and Development of Vietnam (BIDV) during the period 2019-2023. The author employs both qualitative and quantitative research methods, including statistical and comparative analysis, data analysis methods using information collected from the Reports and Websites of the State Bank of Vietnam (SBV), Consolidated Financial Statements of a number of Commercial Banks (CBs), field research at BIDV and related domestic and foreign studies. Based on the research results regarding capital formation (equity, charter capital and mobilized capital) of BIDV, the author proposes several solutions and recommendations to enhance BIDV's capital formation capacity in the coming time.***

• Keywords: *capital formation, equity, charter capital, mobilized capital.*

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1. Introduction

In the business operations of banks, capital plays a crucial role in directly influencing operational efficiency, ensuring safety, and reinforcing customer trust. Therefore, capital formation for commercial banks' business activities has consistently attracted the attention of banking administrators and the banking industry. Compared to other countries in the region, the capital size of commercial banks in Vietnam, including BIDV, remains relatively modest. Enhancing BIDV's business operations and competitiveness requires implementing effective solutions to strengthen its capital formation capabilities. This is a vital factor for BIDV to maintain sustainable business operations and to compete effectively with other commercial banks in the region and globally in the era of integration.

2. Research Methodology

2.1. Data collection method

The study utilizes secondary data collected from SBV reports and websites, consolidated financial statements of commercial banks, on-site studies at BIDV during the 2019-2023 period, and related domestic and international research on capital formation in commercial banks.

2.2. Data analysis methods

The research employs qualitative and quantitative research methods, including statistical and comparative analysis, to evaluate BIDV's capital formation activities. Based on the collected results, the authors provide assessments and propose solutions and recommendations to enhance BIDV's capital formation capacity in the future.

3. Research results

3.1. Equity and charter capital

Table 1: BIDV's equity and charter capital for the period 2019-2023 (Billion VND)

Items	2019	2020	2021	2022	2023
- Equity	72,636	74,235	81,018	96,781	115,171
Growth over last year	*46.48%*	*2.20%*	*9.14%*	*19.46%*	*19.00%*
- Charter capital	40,220	40,220	50,585	50,585	57,004
Growth over last year	*17.65%*	*0%*	*25.77%*	*0%*	*12.69%*

Source: BIDV's consolidated financial statements over the years

During the 2019-2023 period, BIDV's equity demonstrated a consistent upward trajectory. In 2020, amidst the initial year of the COVID-19 pandemic, BIDV's equity was recorded at 74,235 billion VND, reflecting a modest growth rate of 2.20% (equivalent to 1,599 billion VND) compared to 2019. Post-pandemic, BIDV significantly strengthened its internal equity foundation, enhancing its financial position. Notably, in 2022, BIDV's equity expanded to 96,781 billion VND, achieving a substantial growth rate of 19.46% (equivalent to 15,853 billion VND) relative to 2021. By 2023, this upward momentum continued, with equity reaching 115,171 billion VND, corresponding to a growth rate of 19.0% (equivalent to 18,390 billion VND) over the previous year.

As of December 31, 2023, the Vietnam Joint-Stock Commercial Bank for Foreign Trade (VCB) held the

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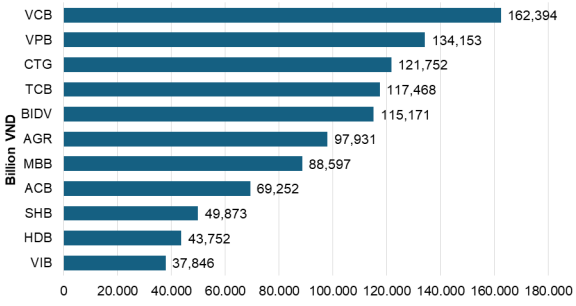
*** BIDV*

top position in equity size among the 11 commercial banks with the highest equity within Vietnam's banking system. The Vietnam Joint-Stock Commercial Bank for Industry and Trade (CTG) ranked second, while BIDV was positioned fifth.

Figure 1: Equity size of some commercial banks in 2023

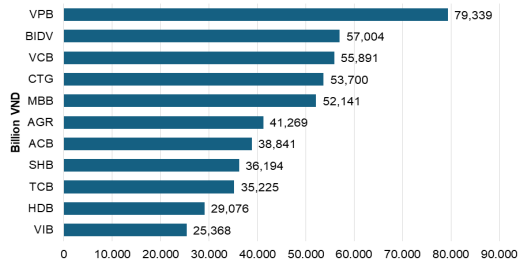


Source: Consolidated financial statements of commercial banks in 2023

BIDV's charter capital showed an upward trend during the 2019-2023 period. In 2019, its charter capital stood at 40,220 billion VND. By 2021, this figure had increased to 50,585 billion VND, reflecting a growth rate of 25.77% (equivalent to 10,365 billion VND). By the end of 2023, BIDV issued 641.9 million common shares with a par value of 10,000 VND per share, equivalent to 1.69% of the outstanding shares. As a result, BIDV's charter capital reached 57,004 billion VND, representing a growth of 41.73% (equivalent to 16,784 billion VND) compared to 2019 and 12.69% (equivalent to 6,419 billion VND) compared to 2022. The additional charter capital was fully allocated to enhance business operations, distributed across various areas of BIDV's activities with a rational structure, ensuring the efficient utilization of capital.

As of December 31, 2023, BIDV's charter capital reached 57,004 billion VND, ranking second among Vietnamese commercial banks. The top position was held by Vietnam Prosperity Joint-Stock Commercial Bank (VPB), with a charter capital of 79,339 billion VND, following its agreement to sell 15% of its shares to Sumitomo Mitsui Banking Corporation (SMBC) through a private share issuance in 2022.

Figure 2: Charter capital size of some commercial banks in 2023



Source: Consolidated financial statements of commercial banks in 2023

3.2. Mobilized capital

Each bank establishes its own capital mobilization policies based on its specific needs and business objectives. To secure substantial capital, commercial banks must implement appropriate mobilization strategies that effectively attract the necessary funds from the economy, supporting their business activities and overall development.

Table 2: BIDV's capital mobilization scale and growth in the period 2019-2023 (Billion VND)

Target	2019	2020	2021	2022	2023
- Scale	1,167,639	1,274,554	1,489,119	1,619,683	1,887,311
Growth over last year	*12.67%*	*9.16%*	*16.83%*	*8.77%*	*16.52%*

Source: BIDV's consolidated financial statements over the years

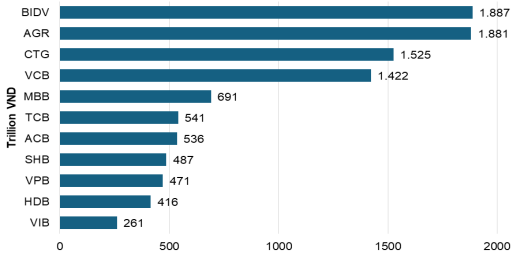
BIDV's mobilized capital exhibited a consistent upward trend during the 2019-2023 period. In 2020, the bank's mobilized capital reached 1,274,554 billion VND, reflecting an increase of 106,915 billion VND and a growth rate of 9.16% compared to 2019. By 2023, BIDV's mobilized capital had risen to 1,887,311 billion VND, marking an increase of 719,672 billion VND and a growth rate of 61.63% compared to 2019, as well as a growth of 16.52% (equivalent to 267,628 billion VND) compared to 2022.

During the 2019-2023 period, BIDV consistently ranked among the leading commercial banks in Vietnam in terms of mobilized capital. In 2023, despite challenging economic conditions, BIDV demonstrated exceptional performance. The year was characterized by the State Bank of Vietnam's cautious tightening of monetary policy, reduced credit demand, and significant fluctuations in domestic and international gold prices, which adversely affected investor confidence. While several banks faced difficulties as customers withdrew savings to invest in gold or real estate due to declining interest rates, BIDV successfully secured the top position among the 11 largest commercial banks in Vietnam. Its mobilized capital reached 1,887 trillion VND, surpassing the Vietnam Bank for Agriculture and Rural Development (AGR) in second place with 1,878 trillion VND, the Vietnam Joint-Stock Commercial Bank for Industry and Trade (CTG) in third place with 1,525 trillion VND, and the Vietnam Joint-Stock Commercial Bank for Foreign Trade (VCB) in fourth place with 1,422 trillion VND.

Although the capital mobilization growth rate of Big4 banks in 2023 compared to 2022 is lower than that of other joint stock commercial banks, it still has a positive growth rate. Within this group, BIDV recorded the highest growth rate in mobilized capital at 16.52%, ranking seventh among the 11 banks analyzed. CTG followed with a growth rate of 13.89%, ranking 8th. VCB came next with a growth rate of 12.09%, placing 10th, while AGR had the lowest growth rate in the

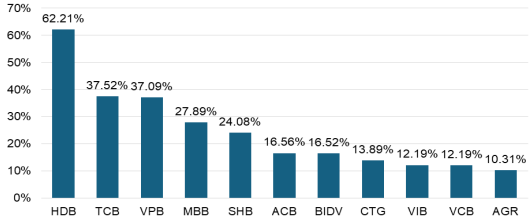
group at 10.31%, ranking last among the 11 banks in the comparison.

Figure 3: Capital mobilization scale of some commercial banks in 2023



Source: Consolidated financial statements of commercial banks in 2023

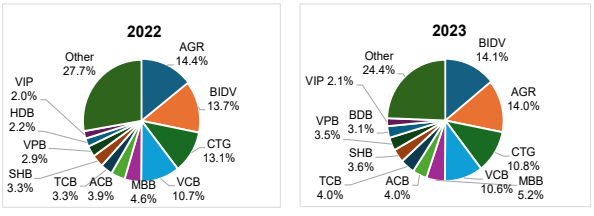
Figure 4: Capital mobilization growth rate of some commercial banks in 2023 compared to 2022



Source: Consolidated financial statements of commercial banks in 2022 and 2023

As of December 31, 2023, BIDV held the largest market share in mobilized capital at 14.1%, an increase of 0.4 percentage points compared to 13.7% in 2022. Among the 11 banks analyzed, 8 banks experienced an increase in market share for mobilized capital in 2023 compared to 2022, including VPB, MBB, HDB, BIDV, TCB, CTG, SHB, and ACB. Within the Big4 group, CTG recorded a market share increase of 0.1 percentage points, while the other two banks, VCB and AGR, saw declines of 0.1 and 0.4 percentage points, respectively.

Figure 5: Capital mobilization market share of some commercial banks in 2022 and 2023

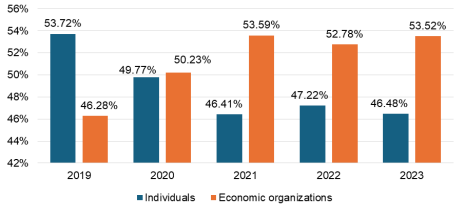


Source: Consolidated financial statements of some commercial banks in 2022 and 2023

**** BIDV's capital mobilization structure according to customer segment***

During the 2019-2023 period, BIDV's mobilized capital structure by customer segment underwent significant changes. In 2019, the proportions of mobilized capital from individuals and economic organizations were 53.72% and 46.28%, respectively. By 2020, this structure became more balanced, at 49.77% and 50.23%. However, by 2021, a notable shift occurred, with the share of capital from individuals decreasing to 46.41%, while that from economic organizations rose to 53.59%. By 2023, the structure was 46.48% from individuals and 53.52% from economic organizations. Although capital mobilized from economic organizations increased rapidly over the years, it is inherently less stable, as it can be withdrawn at any time to support production and business activities. This poses challenges for BIDV in managing the maturity balance of capital and ensuring effective capital utilization, potentially impacting the bank's financial stability.

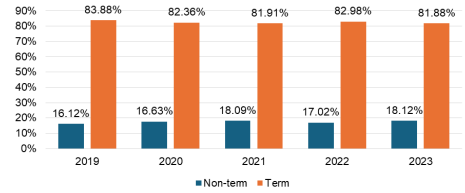
Figure 6: Capital mobilization structure according to BIDV's customer segment for the period 2019-2023



Source: BIDV's consolidated financial statements for the period 2019-2023

**** BIDV's capital mobilization structure by term***

Figure 7: BIDV's capital mobilization structure by term in the period 2019-2023



Source: BIDV's consolidated financial statements for the period 2019-2023

During the 2019-2023 period, BIDV's capital mobilization structure by term underwent notable changes, with an increasing proportion of non-term capital and a corresponding decrease in term capital. Despite this shift, BIDV consistently maintained the proportion of term capital at above 80%, ensuring a stable funding base. This stability enabled the bank to meet regulatory requirements regarding operational limits and safety ratios set by the State Bank of Vietnam (SBV), particularly compliance with the ratio of short-term capital used for medium- and long-term lending.

4. Recommendations and Solutions

Based on the analysis, the author proposes several solutions and recommendations to enhance BIDV's capital formation capacity in the future:

Firstly, increasing equity capital must align with BIDV's business strategy for each specific period, closely adhering to the State Bank of Vietnam (SBV)'s

requirements on risk management and minimum capital adequacy ratios. This approach should aim to meet higher risk management and capital safety standards, such as advanced risk measurement and internal capital calculation methods under Basel II and the regulations of Basel III. By doing so, BIDV can strengthen its risk management capabilities, enhance its resilience to potential risks, improve its market credit rating, and ensure business continuity. Furthermore, optimizing capital utilization requires determining a rational capital structure that is consistent with BIDV's scale, operational circumstances, and customer segments. This ensures that additional equity capital and charter capital not only offset unforeseen losses caused by potential risks but also maintain safety ratios in operations. Ultimately, these measures contribute to improving BIDV's competitiveness against joint-venture and foreign banks operating in Vietnam, while solidifying its leading role in the financial market and delivering high-quality products and services.

Secondly, alongside the annual business growth plans, increasing charter capital is essential for BIDV to strengthen its financial capacity. This includes scaling up operations, enhancing competitiveness, and meeting plans for expanding its transaction network. Additionally, increased charter capital supports continued investment in technological systems to modernize operations, facilitate the development of new products, and improve customer service experiences. However, the implementation of the Credit Institutions Law No. 32/2024/QH15, effective from July 1, 2024, will significantly affect the process of increasing charter capital for banks. The new law introduces requirements and regulations regarding minimum capital, risk management, and the organization of credit institutions, presenting both opportunities and challenges. BIDV must ensure compliance with these regulations to maintain lawful operations while also improving management quality and enhancing its financial capacity.

Thirdly, to effectively carry out capital mobilization in the current competitive environment, BIDV should focus on the following measures:

- BIDV's capital mobilization strategies should exhibit a high degree of flexibility and adaptability to align with socio-economic trends, available financial resources, and the bank's operational requirements at different points throughout the year such as the beginning, middle, or end of the fiscal year or to address the seasonal dynamics of lending activities across various sectors. Moreover, BIDV should prioritize enhancing its financial advisory and support services, providing customers with expert guidance on banking and financial matters. Crucially, BIDV should assist clients in constructing well-rounded investment portfolios and selecting from its diverse range of services. This not only meets customer needs comprehensively but also reinforces the bank's relationships with its clients, fostering trust and promoting sustained customer engagement over the long term.

- BIDV should place strategic emphasis on expanding its pool of term capital to address the medium- and long-term financial requirements of economic entities, particularly as the economy transitions into a recovery phase. Although the scale and proportion of non-term capital increased steadily between 2019 and 2023, providing BIDV with a substantial source of low-cost funding and enhancing profitability through significant interest rate spreads, insufficient focus on mobilizing medium- and long-term capital could significantly hinder the bank's ability to support medium- and long-term financing for key economic stakeholders. To mitigate this risk, BIDV must prioritize attracting term capital, particularly medium-term resources, to ensure a stable and sustainable funding base. This is especially critical as the demand for financial resources to support production and business expansion over medium- and long-term horizons is expected to rise in tandem with economic stabilization and growth. Strengthening the mobilization of term capital will enable BIDV to maintain a robust financial structure, effectively supporting its credit operations and aligning with market demands.

Conclusion: Based on the analysis and evaluation of BIDV's capital formation activities during the 2019-2023 period, the author has proposed several solutions and recommendations to enhance BIDV's capital formation capacity in the future. Achieving the targeted capital goals will provide BIDV with favorable conditions to implement its business plans effectively, ensuring compliance with capital adequacy ratios not only as required by the State Bank of Vietnam but also in alignment with international standards. Furthermore, these measures will gradually enhance BIDV's competitiveness both in the domestic market and on the global stage.

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ESG AND COMPANY MARKET VALUE: THE MEDIATING EFFECT OF FINANCIAL PERFORMANCE

Le Huu Phuc* - PhD. Bui Thu Hien**

Abstract: ***This study explores the correlation between ESG performance and company market value, with a particular emphasis on the mediating role of financial performance within listed firms in Vietnam. The main goal of this study is to analyze a representative sample of 199 publicly listed companies in Vietnam from 2019 to 2023. The findings reveal that ESG positively impacts market value by enhancing financial performance, particularly profitability. By investigating the relationship between ESG performance and company market value, alongside the mediating role of financial performance, this study contributes meaningfully to existing knowledge. Focusing on financial performance as a mediator, the research offers deeper insights into how ESG factors influence market value. The findings hold practical relevance for various stakeholders, including investors, policymakers, and corporate managers. By emphasizing the role of ESG in driving both financial performance and market value, the study highlights the necessity for companies to embed ESG considerations into their strategic decision-making to improve long-term sustainability, reduce risks, and attract socially responsible investors. Additionally, the study provides actionable recommendations for stakeholders such as investors and policymakers, reinforcing the importance of integrating ESG principles into business and regulatory frameworks.***

• Keywords: *ESG, company market value, financial performance, mediating effect.*

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1. Introduction

Research on Environmental, Social, and Governance (ESG) and the market value of companies is essential as ESG has become a crucial factor in evaluating financial performance and the comprehensive value of businesses. Companies committed to sustainable practices often outperform their peers in stock market performance and accounting measures over time (Eccles, Ioannou, and Serafeim, 2014). This superior performance can be attributed to better stakeholder engagement, improved innovation processes, and robust governance mechanisms, all highlighting the strategic advantage of integrating sustainability into business operations.

Studying the mediating role of financial performance is necessary to better understand how ESG impacts a company's market value. Factors such as reputation, customer loyalty, and operational efficiency can be enhanced through ESG commitments, leading to long-term financial improvements (Flammer, 2015). This research helps to elucidate how ESG factors can lead to improvements in financial metrics, which can reflect in market value and investor confidence.

Previous research has highlighted the intricate relationship between ESG performance and company value, often examining the mediating role of financial performance indicators. For instance, studies by Dhaliwal, Tsang, and Yang (2011), as well as Jo and Harjoto (2011), utilized comprehensive meta-analyses across various regions and industries, demonstrating that ESG factors significantly influence financial performance, which in turn contributes to company market value.

The present study investigates the relationship between ESG performance and key financial metrics of listed companies in Vietnam. It seeks to analyze financial indicators to understand how ESG performance aligns with the financial health and stability of these firms. Additionally, the study examines the connection between ESG performance and market value, aiming to determine how ESG factors are reflected in the valuation of these companies. Using quantitative methods, the research empirically explores the factors influencing the interplay between ESG performance, financial performance, and market value. The data, spanning the period from 2019 to 2023, is sourced from financial reports, reputable

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industry publications, and market data. The primary methodologies include the Ordinary Least Squares (OLS) model, Fixed-Effect Model (FEM), Random-Effect Model (REM), and Feasible Generalized Least Squares (FGLS) approach. By employing these methods, the study aims to uncover the direct impact of ESG performance on financial outcomes and market valuation, while also clarifying the mediating role of financial performance in this relationship.

The next parts of this paple include: (ii) Literature Review on ESG, Company Market Value, and Financial Performance, (iii) Research Methodology, (iv) Research Results and Discussions, and (v) Conclusions and Recommendations.

2. Literature Review

The relationship between ESG and company market value

Research has consistently demonstrated a positive link between ESG practices and company market value. Studies by Darnall et al. (2010) and Delmas & Pekovic (2018) highlight how environmentally sustainable practices boost business performance. Aragon-Correa et al. (2008) and Ambec & Lanoie (2008) emphasize the importance of aligning environmental strategies with organizational goals to enhance competitiveness. Margolis & Walsh (2003) provide strong evidence that firms with robust CSR commitments outperform peers in market valuation and shareholder value creation. Hubbard & Lenne (2013) underscore the evolving nature of CSR, emphasizing adaptability and proactive engagement with social and environmental issues.

Overall, ESG factors significantly influence market value by driving financial performance, improving operational efficiency, and strengthening competitive positioning, ultimately reflecting firms' ability to meet stakeholder expectations and adapt to market dynamics.

The Mediating Effect of Financial Performance

Financial Performance and ESG

According to Hart (1997) and Elkington (1997), businesses must go beyond basic environmental initiatives to achieve long-term sustainability. Hart (1997) advocates for a shift from superficial environmental actions to a comprehensive rethinking of business operations and strategies. He introduces the "sustainable value framework," which positions sustainability as more than a matter of compliance or risk management, it becomes a key driver of innovation and financial growth. Similarly, Elkington (1997) presents the concept of the Triple Bottom Line (TBL), which expands traditional success metrics to include social and environmental performance alongside financial results. He emphasizes that businesses should evaluate their success based on their impact on people, the planet, and profit.

At the same time, Barney's (1991) resource-based theory highlights the importance of a firm's resources and capabilities in achieving sustained competitive advantage. Within the framework of Environmental, Social, and Governance (ESG) considerations, this theory suggests that firms excelling in ESG performance often possess unique and valuable resources. These resources not only help address environmental and social challenges but also create economic value and reduce risks.

Financial Performance and Company Market Value

The relationship between financial performance and market value can be understood through two primary theories: absolute valuation and relative valuation. Absolute valuation, or intrinsic valuation, suggests that a company's true value is based on its fundamental characteristics and expected future cash flows. As explained by James Chen (2020), the intrinsic value is calculated by discounting the company's projected future cash flows to their present value using an appropriate discount rate. This theory assumes that while market prices may temporarily deviate from intrinsic value, they eventually align over time. Analysts applying absolute valuation typically use methods like discounted cash flow (DCF) analysis, dividend discount models (DDM), or residual income models to determine a company's intrinsic worth based on its financial performance and growth potential.

In contrast, relative valuation assesses a company's market value by comparing it with similar companies or market benchmarks. According to Alicia Tuovila (2024), this approach evaluates a company's value relative to its peers using financial metrics such as the price-to-

earnings (P/E) ratio or other valuation multiples. Relative valuation operates on the premise that investors often make decisions based on comparative metrics, particularly in efficient markets where information is readily available and quickly reflected in stock prices.

3. Research Methodology

3.1. Research model and research hypothesis

This study turns its focus towards other financial performance indicators, drawing from established research findings. Notably, the metrics of return on equity (ROE), total asset turnover (TAT), and net profit growth (NPG) emerge as commonly utilized benchmarks in evaluating the financial health and operational efficiency of listed companies.

ESG, Profitability and Company Market Value

First, the model of the impact of ESG performance on the company's market value is constructed:

$$Model\ 1:\ MV(it) = \alpha 10 + \alpha 11 * ESG(it) + \alpha 12 * Size(it) + \alpha 13 * Lev(it) + \alpha 14 * TAT(it) + \alpha 15 * NPG(it) + \alpha 16 * GDP(it) + \varepsilon 1it$$

Where is the MV(it) value of company i in year t, α10 is a constant term and ε1it is a residual term, α11 represents the influence coefficient of ESG performance on market value and α12 - α16 represent the influence coefficient of each control variable on company value.

Second, the model of the impact of ESG performance on profitability is constructed:

$$Model\ 2:ROE(it) = \alpha 20 + \alpha 21 * ESG(it) + \alpha 22 * Size(it) + \alpha 23 * Lev(it) + \alpha 24 * TAT(it) + \alpha 25 * NPG(it) + \alpha 26 * GDP(it) + \varepsilon 2it$$

Where ROE(it) is the return on total equity of company *i* in year *t*, α*20* is a constant term, ε2it is a residual term, α*21* represents the influence coefficient of ESG performance on profitability, and α22 - α26 represent the influence coefficient of each control variable on profitability.

Finally, a test model of the mediating effect of profitability is constructed:

$$Model\ 3:\ MV(it) = \alpha 30 + \alpha 31 * ESG(it) + \alpha 32 * ROE(it) + \alpha 33 * Size(it) + \alpha 34 * Lev(it) + \alpha 35 * TAT(it) + \alpha 36 * NPG(it) + \alpha 37 * GDP(it) + \varepsilon 3it$$

Where is the MV(it) value of company i in year t, α30 is a constant term and ε3it is a residual term, and α33–α37 represent the influence coefficient of control variables (Size, Lev, TAT, Growth) on profitability.

Based on the above theories, this section proposes the following hypotheses:

H1: Improved ESG performance positively contributes to the enhancement of company market value.

H2a: Improved ESG performance positively influences profitability.

H3a: Profitability mediates the relationship between ESG performance and company market value..

ESG, Operational Capability and Company Market Value

$$Model\ 4:\ MV(it) = \beta 10 + \beta 11 * ESG(it) + \beta 12 * Size(it) + \beta 13 * Lev(it) + \beta 14 * ROE(it) + \beta 15 * NPG(it) + \beta 16 * GDP(it) + \epsilon 1it$$

$$Model\ 5:\ TAT(it) = \beta 20 + \beta 21 * ESG(it) + \beta 22 * Size(it) + \beta 23 * Lev(it) + \beta 24 * ROE(it) + \beta 25 * NPG(it) + \beta 26 * GDP(it) + \epsilon 2it$$

$$Model\ 6:\ MV(it) = \beta 30 + \beta 31 * ESG(it) + \beta 32 * TAT(it) + \beta 33 * Size(it) + \beta 34 * Lev(it) + \beta 35 * ROE(it) + \beta 36 * NPG(it) + \beta 37 * GDP(it) + \epsilon 3it$$

Where MVit is the market value of company i in t, TAT_{it} is the total asset turnover of the company i in t, β_{10}, β_{20}, and β_{30} are constant terms. ϵ1it, ϵ2it, and ϵ3it are residual, β_{11} said ESG performance coefficient, β21 represents the influence coefficient of ESG performance on TAT, and β_{12}-β_{37} represent the control variables influence coefficient of the market value of the company.

The second set of hypotheses is further proposed:

H1: Improved ESG performance positively contributes to the enhancement of company market value.

H2b: Improved ESG performance positively influences operational capacity.

H3b: Operational capacity mediates the relationship between ESG performance and company market value.

ESG, Growth Capability and Company Market Value

$$Model\ 7:\ MV(it) = \gamma 10 + \gamma 11 * ESG(it) + \gamma 12 * Size(it) + \gamma 13 * Lev(it) + \gamma 14 * ROE(it) + \gamma 15 * TAT(it) + \gamma 16 * GDP(it) + \theta 1it$$

$$Model\ 8:\ NPG(it) = \gamma 20 + \gamma 21 * ESG(it) + \gamma 22 * Size(it) + \gamma 23 * Lev(it) + \gamma 24 * ROE(it) + \gamma 25 * TAT(it) + \gamma 26 * GDP(it) + \theta 2it$$

$$Model\ 9:\ MV(it) = \gamma 30 + \gamma 31 * ESG(it) + \gamma 32 * NPG(it) + \gamma 33 * Size(it) + \gamma 34 * Lev(it) + \gamma 35 * ROE(it) + \gamma 36 * TAT(it) + \gamma 37 * GDP(it) + \theta 3it$$

The Third set of hypotheses related to Growth Indicator is further proposed:

H1: Improved ESG performance positively contributes to the enhancement of company market value.

H2c: Improved ESG performance positively influences growth capacity.

H3c: Growth capacity mediates the relationship between ESG performance and company market value.

Variables measurement as follows: MV: Market value using P/B; *ESG:* Converted by the company's ESG rating; *ROE*= Net profit/ Common stockholders' equity; *TAT*= Net operating income/ Total average assets; *NPG*= Net profit growth/ Net profit of last year; *SIZE*= The natural logarithm of a company's average annual total assets; *LEV*= Average annual total liabilities/Average annual total assets; GDP= Total output/ Total population.

3.2. Research sample

Our study is based on a sample of 199 companies listed on the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX). These companies were selected based on the availability and completeness of their ESG data, ensuring the reliability and robustness of the analysis.

4. Research results and discussions

4.1. Descriptive statistics

Table 1. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
MV	1,648492	1,03752	0,21	7,48
ESG	0,394603	0,1720211	0,05	0,74
ROE	0,1433047	,0941546	-0,07	0,6734
TAT	1,74196	1,526798	0,07	7,01
NPG	0,0718012	0,4561644	-0,9037	1,4984
Lev	0,4581106	0,2054745	0,02	0,91
SIZE	7,968667	1,614899	4,732464	14,6488
GDP	3856	314,342	3491	4284
Observations	995	995	995	995

Source: Calculated by the authors (2024)

Table 1 provides an overview of the descriptive statistics for the variables used in the analysis, covering the 995 observations over the period from 2019 to 2023. The dataset includes 199 companies listed on the Ho Chi Minh Stock Exchange and the Hanoi Stock Exchange, resulting in a total of 995 observations.

4.2. Correlation Analysis

Table 2 reveals that the highest absolute correlation coefficient between variables is 0,4817. Therefore, no significant multicollinearity issue exists among the variables in the model developed in this study, enabling regression analysis to proceed in the subsequent steps.

Table 2. Pearson correlation analysis

	MV	ESG	ROE	TAT	NPG	Lev	SIZE	GDP
MV	1,0000							
ESG	0,0949	1,0000						
ROE	0,5001	0,0706	1,0000					
TAT	0,0098	-0,0295	0,1774	1,0000				
NPG	0,1080	0,0551	0,3827	0,0735	1,0000			
Lev	0,0074	-0,0493	-0,0605	0,3644	0,0226	1,0000		
SIZE	0,1951	-0,0679	0,0039	-0,1072	0,0345	0,4817	1,0000	
GDP	-0,1282	-0,0701	-0,1571	-0,0607	-0,1329	-0,0563	0,0729	1,0000

Source: Calculated by the authors (2024)

4.3. Regression Results

Regression analysis of the relationship between ESG performance and company market value

Table 3. The estimation results of the model (1), (4), (7)

VARIABLES	(1)	(4)	(7)
	MV	MV	MV
ESG	0,580***	0,433***	0,407**
	(0,184)	(0,160)	(0,162)
ROE		5,730***	5,346***
		(0,319)	(0,308)
TAT	0,0664***		-0,0208
	(0,0237)		(0,0214)
NPG	0,160**	-0,255***	
	(0,0699)	(0,0653)	
Lev	-0,912***	-0,391**	-0,321*
	(0,200)	(0,154)	(0,179)
SIZE	0,197***	0,157***	0,148***
	(0,0239)	(0,0195)	(0,0211)
GDP	-0,000458***	-0,000259***	-0,000229**
	(0,000102)	(8,95e-05)	(8,99e-05)
Constant	1,904***	0,601	0,611
	(0,430)	(0,380)	(0,384)
Observations	995	995	995
R-squared	0.094	0.312	0.302

Note: The values in parentheses (*), (**), (***) correspond to significance levels of 10%, 5% and 1%.

Source: Calculated by the authors (2024)

Using the OLS estimation method, the results from all three models show that the estimated coefficient for the ESG variable ranges from approximately 0,407 to 0,580, with all coefficients being statistically significant at the 1% level. These findings support Hypothesis H1, confirming that improvements in ESG performance enhance company market value. This is consistent with existing literature, such as Hammami's study (2015), which found that companies with strong ESG practices tend to have higher market values. Additionally, the results align with Maqbool and

Zameer (2019), who also identified a positive correlation between ESG performance and market value, suggesting that companies prioritizing sustainable and ethical practices are rewarded with higher market valuations.

Mediating Effect of Financial Performance on the relationship between ESG and Company Market Value

To validate hypothesis H2, equations (2), (5), and (8) were employed to investigate whether enhancements in ESG performance contribute to improvements in financial performance. The findings are displayed in Table 4 below.

Table 4. The estimation results of the model (2), (5), (8)

VARIABLES	(2) ROE	(5) TAT	(8) NPG
ESG	0,0267*	-0,365	0,0710
	(0,0156)	(0,241)	(0,0782)
TAT	0,0151***		-0,00166
	(0,00200)		(0,0103)
NPG	0,0716***	-0,0157	
	(0,00592)	(0,0980)	
Lev	-0,105***	4,180***	0,0729
	(0,0169)	(0,230)	(0,0864)
SIZE	0,00818***	-0,363***	0,00672
	(0,00202)	(0,0293)	(0,0102)
GDP	-3,47e-05***	0,000147	-0,000106**
	(8,62e-06)	(0,000134)	(4,35e-05)
ROE		3,605***	1,804***
		(0,478)	(0,149)
Constant	0,218***	1,780***	0,109
	(0,0364)	(0,570)	(0,186)
Observations	995	995	995
R-squared	0,212	0,285	0,155

Note: The values in parentheses (*), (**), (***) correspond to significance levels of 10%, 5% and 1%.

Source: Calculated by the authors (2024)

A notable positive correlation is found between ESG performance and company profitability, supporting Hypothesis H2a. However, the relationship between ESG performance and operating capacity, as shown in Model (5), lacks statistical significance. This challenges the theoretical hypothesis, indicating that improvements in ESG performance may not significantly affect operating capacity. As a result, Hypothesis H2b is rejected, and Hypothesis H3b, which suggests that operational capability mediates the impact of ESG performance on market value, is also overturned.

The connection between ESG performance and growth capability, as analyzed in Model (8), shows no statistically significant results. This challenges the hypothesis that ESG performance influences growth capability, leading to the rejection of Hypothesis H2c. Additionally, the failure of Hypothesis H3c suggests that growth capability may not mediate the relationship between ESG performance and market value.

Table 5. The estimated results of the model 3

VARIABLES	OLS	REM	FEM	FGLS
ESG	0,425***	0,219	-0,266	0,226**
	(0,160)	(0,225)	(0,303)	(0,111)
ROE	5,807***	3,294***	1,418***	4,336***
	(0,328)	(0,370)	(0,429)	(0,242)
TAT	-0,0212	-0,0343	-0,0196	-0,0222
	(0,0212)	(0,0320)	(0,0498)	(0,0146)
NPG	-0,255***	-0,198***	-0,0928*	-0,248***
	(0,0653)	(0,0490)	(0,0481)	(0,0306)
Lev	-0,303*	0,244	2,101***	-0,185
	(0,177)	(0,249)	(0,351)	(0,117)
SIZE	0,150***	0,0674*	-0,825***	0,141***
	(0,0210)	(0,0355)	(0,111)	(0,0143)
GDP	-0,000256**	-0,000324***	-4,25e-06	-0,000214***
	(8,95e-05)	(6,18e-05)	(7,29e-05)	(4,87e-05)
Constant	0,639*	1,765***	7,217***	0,644***
	(0,381)	(0,348)	(0,731)	(0,213)
Observations	995	995	995	995
Prob > F	0,0000	0,0000	0,0000	Wald chi2(7) = 505,57
				Prob > chi2 = 0,0000
TESTING		**TESTING VALUE**		**RESULT**
Choosing between OLS and REM (Breusch - Pagan)		P-value= 0,0000		Choosing REM
Choosing between FEM and REM (Hausman)		P-value= 0,0000		Choosing FEM
Choosed Model				**FEM**
Heteroskedasticity		Chi2 (199) = 5,6e+05 Prob > chi2 = 0,0000		There is evidence of heteroskedasticity
Autocorrelation		F(1,198) = 18,590 Prob > F = 0,0000		There is evidence of autocorrelation

Note: The values in parentheses (*), (**), (***) correspond to significance levels of 10%, 5% and 1%.

Source: Calculated by the authors (2024)

Regarding Hypothesis H3a, which examines whether profitability mediates the effect of ESG performance on market value. The results from Model (3) are shown in Table 5. After conducting the Breusch-Pagan test, the P-value indicates heteroscedasticity, suggesting the use of the Fixed Effects Model (FEM) over OLS and REM models. However, FEM results were found to be biased due to issues with error variance and autocorrelation, so the Feasible Generalized Least Squares (FGLS) method was used for more reliable estimates.

The FGLS regression results confirm that improved ESG performance positively influences market value, partially through profitability. This supports Hypothesis H3a, indicating that profitability is a key pathway through which ESG impacts market value. Specifically, a 1% increase in ESG performance leads to a 0,226% increase in market value for Vietnamese companies. These findings align with previous studies by Dewi (2023) and Anser et al. (2018).

Furthermore, profitability, as measured by ROE, shows a significant positive effect on market value. A 1% increase in ROE corresponds to a 4,336% increase in market value, supporting previous research by Maditinos et al. (2011) and Almumani (2018). These results confirm that profitability mediates the relationship between ESG performance and market value.

5. Conclusions and Recommendations

This paper analyzes the relationships between ESG performance, financial performance, and company market value, using panel data from 199 listed companies across various industries. The study applies a mediation effect model to explore these interactions. Key findings include that improved ESG performance positively impacts profitability, suggesting companies with strong ESG practices are more profitable. However, ESG improvements do not significantly affect operational capacity or growth potential. The research also shows that enhanced ESG performance boosts market value, with profitability acting as a key mediator. In essence, companies with better ESG performance become more profitable, and this increased profitability drives higher market valuations.

Therefore, the research propose some recommendations for stakeholders. For listed firms, adopting robust ESG practices significantly enhances a company's reputation, making it more attractive to investors. Firms that demonstrate strong ESG performance often experience increased investor confidence and favorable market recognition. Financially, improved ESG practices can lead to enhanced profitability and higher market valuation. However, while ESG improvements boost profitability, they do not directly impact operational efficiency or growth rates. Companies must focus on integrating ESG considerations into their core strategies to achieve comprehensive business growth and efficiency. For investors, educating investors about the long-term benefits of ESG investments is crucial for making informed decisions. Recognizing the financial advantages of supporting companies with strong ESG practices helps investors shift their perspectives and prioritize sustainability in their portfolios. Transparent reporting on ESG efforts further builds trust, ensuring investors see a clear commitment to responsible governance. Investing in high ESG-performing companies can lead to better financial outcomes, as these firms typically show higher profitability and increased market value. Finally, policy makers play a vital role in fostering a sustainable business environment by introducing incentives such as tax breaks and subsidies for exemplary ESG practices. These financial incentives lower the barriers for companies aiming to enhance their ESG efforts, promoting broader adoption of sustainable practices. Establishing and enforcing minimum ESG standards helps ensure a baseline level of corporate responsibility across the market. Additionally, national awareness campaigns and educational programs raise public and business understanding of ESG importance, driving a culture of sustainability. Public-private partnerships further encourage innovative solutions to ESG challenges, promoting collective action toward sustainability goals.

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EU - VIETNAM FREE TRADE AGREEMENT (EVFTA): IMPACT ON EXPORTING AGRICULTURAL PRODUCTS FROM VIETNAM TO EU AND SOME POLICY RECOMMENDATIONS

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Abstract: ***The research focuses on analyzing the impact of the EU-Vietnam Free Trade Agreement (EVFTA) on agricultural exports from Vietnam to the European Union. The agreement is assessed as having a positive effect on Vietnam, especially in terms of the export advantages for agricultural products. The study applies a quantitative analysis method using the SMART model, incorporating data on import-export turnover of 24 agricultural product categories (HS 2-digit codes) under a scenario of 0% tariff reduction once the EVFTA takes effect, along with other essential parameters. The results show an increase in Vietnamese agricultural exports to the EU market following the implementation of the EVFTA. Based on the findings, the authors suggest several policy recommendations to further promote the export of agricultural products from Vietnam to the European Union in the future.***

• Keywords: *agricultural products, EU, EVFTA, export, Vietnam.*

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1. Introduction

The EU-Vietnam Free Trade Agreement (EVFTA), effective from August 1, 2020, presents significant export-import opportunities for Vietnamese goods and marks a major milestone in the comprehensive partnership between Vietnam and the EU. This achievement is the result of a decade of political effort from both sides since the start of FTA negotiations.

Experts believe EVFTA's implementation aids in restructuring Vietnam's exports and imports, providing greater control over markets and a diversified supply chain while mitigating risks related to trade disruptions, climate change, natural disasters, and pandemics. Within its first year, despite the COVID-19 pandemic, two-way trade reached over $54 billion, with Vietnam's exports to the EU at $38 billion, up by 11% (General Department of Vietnam Customs, 2021). The European Commission forecasts an 18% increase in Vietnamese exports to the EU by 2035, adding approximately €15 billion.

Agricultural exports stand to gain the most from tariff reductions, especially for products like fruits, rice, coffee, pepper, and wood. For instance, coffee exports to the EU, previously taxed at 7.5-11.5%, now face zero tariffs under EVFTA, enhancing competitiveness in this key market.

However, EU's strict technical standards, especially for agricultural goods, remain a challenge. Analyzing EVFTA's impact on agricultural exports to the EU is essential to help Vietnam optimize its benefits, make necessary adjustments, and support Vietnamese businesses in boosting exports to this critical market.

2. Literature Review

Several studies highlight the EVFTA's competitive advantages for Vietnamese agricultural exports in the EU market. For example, Nguyen (2020) emphasizes that tariff elimination under the EVFTA has improved market access for Vietnamese agricultural products like coffee, rice, and seafood, making them more competitive compared to similar goods from non-EVFTA nations. Using quantitative methods, such as the SMART model, Le and Tran (2021) provide evidence showing that the EVFTA has positively affected Vietnam's export turnover to the EU by creating increased demand for these products through reduced tariffs. Their study reports a significant rise in both the volume and value of agricultural exports, with trade creation acting as a primary driver.

Moreover, Vo (2022) identifies trade diversion as an additional outcome of the EVFTA, noting that the agreement has made Vietnamese goods more price-competitive relative to those from other non-EU FTA countries. Vo's research indicates a decline in EU imports from other ASEAN nations, such as Thailand and Indonesia, since the EVFTA's implementation, signaling a diversion effect favoring Vietnamese exports. This diversion strengthens Vietnam's positioning in the EU market and demonstrates the EVFTA's role in enhancing Vietnam's agricultural export performance through indirect competitive advantages.

Despite the optimistic outlook, many studies argue that the benefits of the EVFTA for Vietnam's agricultural exports are contingent upon overcoming significant challenges. Nguyen and Pham (2021) emphasize the

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stringent non-tariff barriers in the EU, including high food safety standards, environmental sustainability requirements, and labor practices. Meeting these standards necessitates considerable investments in quality control, sustainable farming, and compliance certifications, which can place a heavy burden on small Vietnamese producers.

Additionally, Phan (2022) points out the competitive pressures arising from other countries with similar agreements with the EU, such as Mexico and Chile. These countries, which also benefit from preferential access to the EU, can undermine Vietnam's competitive advantage if they strengthen their agricultural standards or introduce new competitive products. This situation underscores the need for Vietnam to continuously improve the quality of its agricultural products to maintain an edge in the EU market.

To maximize the benefits of the EVFTA, researchers propose various policy recommendations. Hoang (2023) suggests that the Vietnamese government should focus on educating farmers and exporters about the EVFTA's benefits and the EU's regulatory environment to facilitate compliance. Hoang also recommends fostering public-private partnerships to establish sustainable supply chains that meet EU standards more effectively.

Dang and Bui (2022) advocate for enhancing Vietnam's trade support infrastructure, including certification bodies and export associations, to provide exporters with timely information and assistance related to EU market requirements. They further propose developing policies that support the diversification of agricultural export products and promote value-added goods, ensuring that Vietnam can capitalize on the EVFTA's benefits in the long term.

3. Methodology

3.1. Software for Market Analysis and Restrictions on Trade model (SMART model)

The SMART model is grounded in the theory of partial equilibrium and incorporates a simulation tool that is part of the World Integrated Trade Solution (WITS) database and software provided by the World Bank.

When evaluating the effects of a Free Trade Agreement (FTA) on a country's trade, there are two main approaches: ex-ante assessments, which analyze potential impacts before the agreement takes effect, and ex-post assessments, which evaluate actual impacts after implementation. Given that the EU-Vietnam Free Trade Agreement (EVFTA) took effect on August 1, 2020, it is challenging to conduct an ex-post assessment due to the lack of sufficient data. Consequently, assessing the potential impacts of the EVFTA on Vietnam's agricultural exports to the European market is the most suitable approach at this time.

One of the key advantages of the SMART model is its accessibility and ease of implementation in conjunction with the WITS database. This model enables researchers to obtain significant quantitative results concerning the effects of trade on welfare, tariff revenues, and other aspects of specific products, allowing for detailed analyses at a granular level of trade data. However, the SMART model also has its limitations; specifically, the results are confined to direct effects resulting from changes in trade policy within a given market, as it is based on partial equilibrium theory. This means that it does not account for indirect effects stemming from trade policy changes in other markets (inter-industry effects) or feedback effects, which occur when changes in trade policy in one market influence related markets and subsequently impact the market being analyzed.

In this study, the SMART model will be utilized to assess the implications of the planned tariff reduction scenario under the EVFTA on Vietnam's agricultural trade with the EU. The scenario chosen for analysis is a complete tariff reduction of 100%. By employing the SMART tool, the research team aims to evaluate how the elimination of tariffs will affect the export of agricultural products from Vietnam to the EU. This analysis will focus on specific agricultural products, particularly those classified under HS codes from 01 to 24, as well as codes 1601 and 1602, while explicitly excluding fishery products classified under HS code 03. The data utilized for running the model will be drawn from 2023 figures available through the World Bank's WITS system (World Bank, 2023) and UNCTAD (2023).

3.2. Revealed Comparative Advantage (RCA)

Liesner (1985) built on the theory of comparative advantage to propose a method for assessing whether a country has a comparative advantage in a particular product. His approach involves analyzing the export volume of that product, with the underlying idea that higher export levels of a specific product indicate a comparative advantage in producing it. By examining a country's export performance across different goods, Liesner's method provides insights into which products hold strategic importance for that nation's economy. This analysis enables countries to identify areas of strength and optimize trade policies accordingly.

Table 1. Classification of RCA values

No.	RCA level	Interpretation
1		No Comparative Advantage
2		Weak Comparative Advantage
3		Moderate Comparative Advantage
4		Strong Comparative Advantage

Source: Hinloopen, 2001

4. Results

The RCA index of Vietnam's agricultural sector from 2015 to 2023, based on HS 2-digit classification, is presented in Table 4.6. Products like "Coffee, tea, mate, and spices" (HS 09) show the strongest competitive advantage with an RCA index ranging from about 8 to 30. Other products, such as "Edible fruit and nuts; peel

of citrus fruit or melons" (HS 08), exhibit moderate comparative advantage, with an RCA index between 1.5 and 3. However, several Vietnamese agricultural products lack a comparative advantage, including "Live animals; animal products" (HS 01), "Meat and edible offal" (HS 02), "Dairy products; birds' eggs; natural honey; edible animal products not elsewhere specified" (HS 04), "Cereals" (HS 10), "Milled products; malt; starches; inulin; wheat gluten" (HS 11), "Sausages and similar products of meat, offal, or blood; food preparations based on these products" (HS 1601), "Other prepared or preserved meat, offal, or blood" (HS 1602), "Sugars and sugar confectionery" (HS 17), "Cocoa and cocoa preparations" (HS 18), "Residues and waste from the food industries; prepared animal feed" (HS 23), and "Tobacco and manufactured tobacco substitutes" (HS 24).

Table 2: RCA of Vietnamese agricultural products compared to the world from 2015 to 2023

HS code	2015	2016	2017	2018	2019	2020	2021	2022	2023
01	0.119	0.116	0.100	0.131	0.141	0.161	0.151	0.173	0.181
02	0.026	0.021	0.020	0.020	0.036	0.022	0.018	0.023	0.025
04	0.004	0.003	0.007	0.004	0.003	0.004	0.003	0.005	0.007
05	0.362	0.339	0.352	0.601	1.081	0.288	0.213	0.511	0.725
06	0.062	0.059	0.065	0.075	0.085	0.079	0.080	0.083	0.086
07	0.153	0.150	0.137	0.108	0.124	0.119	0.117	0.122	0.129
08	2.129	2.325	2.620	2.434	2.292	2.094	2.093	2.211	2.513
09	13.984	12.918	11.901	11.473	9.632	8.123	8.011	10.812	11.117
10	0.173	0.146	0.083	0.103	0.199	0.255	0.147	0.212	0.265
11	0.156	0.143	0.159	0.194	0.231	0.180	0.166	0.179	0.181
12	0.078	0.101	0.111	0.136	0.139	0.119	0.107	0.122	0.130
13	0.006	0.033	0.204	0.305	0.416	0.175	0.108	0.211	0.347
14	0.569	0.718	0.801	0.404	0.412	0.512	0.421	0.572	0.773
15	0.010	0015	0.052	0.073	0.110	0.047	0.032	0.058	0.091
1601	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1602	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	0.065	0.053	0.055	0.057	0.054	0.034	0.031	0.043	0.057
18	0.030	0.039	0.033	0.031	0.029	0.026	0.023	0.031	0.038
19	0.509	0.461	0.433	0.462	0.493	0.514	0.491	0.507	0.601
20	0.238	0.280	0.258	0.235	0.303	0.330	0.221	0.312	0.331
21	0.473	0.324	0.370	0.380	0.358	0.423	0.340	0.411	0.489
22	0.017	0.018	0.024	0.029	0.034	0.033	0.021	0.035	0.041
23	0.095	0.053	0.054	0.055	0.064	0.039	0.035	0.047	0.084
24	0.015	0.003	0.007	0.004	0.003	0.004	0.003	0.002	0.005

Source: Calculated based on the data of Eurostat

Additionally, some products have seen an increase in their RCA index, such as "Lac; gums; resins and other vegetable saps and extracts" (HS 13), "Vegetable plaiting materials; vegetable products not elsewhere specified" (HS 14), "Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes" (HS 15), and "Preparations of vegetables, fruits, nuts, or other parts of plants." Conversely, certain agricultural products have experienced a significant decline in RCA, including "Products of animal origin, not elsewhere specified" (HS 05), "Vegetables and certain roots and tubers" (HS 07), and "Milling products; malt; starches; inulin; wheat gluten" (HS 11). This trend is largely due to similarities in agricultural export structures among countries in the region, notably Thailand and China.

The study uses the SMART model to assess the impact of the projected tariff reduction scenario under the EVFTA on Vietnam's agricultural trade with the EU. The chosen scenario is a 100% tariff reduction. By applying the SMART tool, the authors analyze the extent to which tariff elimination affects the export of agricultural products from Vietnam to the EU. The tariff reduction scenario is evaluated based on a model where Vietnam is the exporter, focusing on tariff cuts for agricultural products shipped to the EU. This model's results will indicate changes in the export value of Vietnamese agricultural products to the EU when tariffs are reduced.

Table 3. Trade Impact of Agricultural Products between the EU and Vietnam in 2023 (Thousand USD)

HS code	Impact on Trade total	Trade creation	Trade diversion
01	0	0	0
02	0.509	0.173	0.236
04	0	0	0
05	0	0	0
06	0	0	0
07	0	0	0
08	0	0	0
09	0	0	0
10	0	0	0
11	403.834	315.533	86.301
12	0	0	0
13	0	0	0
14	0	0	0
15	0	0	0
1601	5.659	2.536	2.123
1602	3.818	1.512	1.307
17	605.957	160.912	345.04430
18	309.074	153.655	155.430
19	816.873	418.908	398.065
20	15.411	3.712	11.700
21	2,344.842	909.226	1,435.616
22	295.419	85.647	209.772
23	0	0	0
24	12.589	10.986	1.612
Total	**4,813.576**	**2,062.800**	**2,647.206**

Source: Summarized from SMART-WITS

The complete elimination of tariffs under the EVFTA significantly impacts Vietnam's agricultural exports to the EU by fostering both trade creation and trade diversion. Notably, the EVFTA has no effect on certain product categories, including HS codes 01, 04, 05, 06, 07, 08, 09, 10, 12, 13, 14, 15, and 23.

For the remaining product groups, both trade creation and trade diversion effects between the EU and Vietnam show positive values. This indicates a shift in the EU's import sources for agricultural products, redirecting imports from other countries toward Vietnam. The overall trade impact amounts to USD 4,813.576 thousand, with trade creation contributing USD 2,062.800 thousand and trade diversion adding USD 2,647.206 thousand.

The data from the model indicate that trade diversion has a smaller impact than trade creation, suggesting that the EVFTA, once in effect, boosts Vietnamese agricultural exports to the EU. This reflects an increase in competitiveness for Vietnamese agricultural products over those from competing countries exporting similar goods to the EU, potentially substituting comparable domestic goods in the EU market. Consequently, the EVFTA's

implementation is expected to drive a notable rise in Vietnam's agricultural export turnover to the EU market.

Table 4. Impact on Vietnam's Agricultural Export Turnover in 2023 (Thousand USD)

HS code	Before	After	Value	%
01	11,814.845	11,814.845	0	0
02	3,516.669	3,517.077	0.409	0.01
04	4,166.131	4,166.131	0	0
05	8,592.260	8,592.260	0	0
06	7,442.049	7,442.049	0	0
07	16,541.585	16,541.585	0	0
08	976,420.378	976,420.378	0	0
09	1,312,494.562	1,312,494.562	0	0
10	310.783	310.783	0	0
11	5,928.422	6,330.256	401.834	6.78
12	7,556.971	7,556.971	0	0
13	946.832	946.832	0	0
14	1,374.631	1,374.631	0	0
15	11,748.285	11,748.285	0	0
1601	14.759	19.418	4.659	31.56
1602	12.739	15.557	2.818	22.121
17	2,984.685	3,400.642	505.957	16.95
18	1,901.127	2,210.212	309.084	16.25
19	121,230.767	122,047.739	816.973	0.67
20	85,093.149	85,108.560	15.411	0.02
21	94,943.454	97,288.295	2,344.842	2.47
22	6,715.184	7,010.603	295.419	4.4
23	9,172.577	9,172.577	0	0
24	5.661	18.259	12.598	222.54
Total	**2,690,928.505**	**2,695,548.507**	**4,710.004**	**0.175**

Source: Summarized from SMART-WITS

Table 4 shows the changes in the export value of wood and wood products from Vietnam to the EU. It is evident that the tariff reductions under the EVFTA do not benefit exports for certain product categories; specifically, the export of HS product groups 01, 04, 05, 06, 07, 08, 09, 10, 12, 13, 14, 15, and 23 did not experience any changes before and after the tariff reduction. Conversely, the remaining HS groups saw positive changes in their export values.

5. Conclusion and policy recommendations

The study results show that the EVFTA's implementation brings considerable economic benefits to Vietnam by boosting agricultural export turnover to the EU. According to the SMART model, the EVFTA contributes an increase of USD 4,813.579 thousand, with trade diversion accounting for approximately 60% of the total trade impact, surpassing trade creation. This indicates that the rise in Vietnamese agricultural exports to the EU, as tariffs are reduced to 0%, is largely due to the relative price advantage of Vietnamese agricultural goods over those from other countries exporting to the EU market. Additionally, trade creation constitutes a significant share, approximately 40% of the total trade impact, suggesting that under the EVFTA, Vietnamese agricultural products can compete with and even replace similar goods in the EU domestic market. However, the advantages of tariff reductions under the EVFTA should be cautiously considered, as competing countries are continuously advancing negotiations and signing FTAs with the EU to reduce tariff pressure on their exports to the EU market.

For the Government: The Government should enhance the dissemination of information on the EVFTA to help the business community and workers better understand the commitments under the agreement, thus fostering a mindset shift for effective implementation. Additionally, the Government should analyze and assess the potential impacts of the EVFTA to identify which products can seize new opportunities and which may face significant challenges. This analysis should inform careful assessments of the costs and benefits of market access for these products, alongside recommended strategies.

For Agricultural Enterprises: Businesses must proactively learn about the EVFTA, as only through understanding can they put these commitments into practice. Enterprises should strengthen cooperation, share insights, shift their management and business strategies, and establish production and business networks to build the collective capacity needed to handle competitive pressures. Additionally, companies must pay special attention to sustainability commitments, including labor standards and environmental protection principles, as these are critical issues for the EU. Following the Government's tasks outlined in the EVFTA Implementation Plan, ministries, departments, and cities across the country will develop specific implementation plans for their agencies and localities.

For Industry Associations: Industry associations should act as a bridge between regulatory bodies drafting EVFTA-related legislation, relevant ministry agencies, and businesses. In this role, associations should promptly update businesses on EVFTA-related regulations and legislation, offer implementation guidance, and provide consulting support to help companies address challenges.

Additionally, associations should assist businesses in market access and help identify new opportunities. Associations need to review and supply market information through their networks with industry associations abroad and Vietnamese embassies in various countries. This information-gathering process will support businesses in making informed decisions and guide them in establishing trade relationships aligned with national goals, directions, and policies.

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VIETNAM'S COMMODITY EXPORTS: CURRENT SITUATION AND RECOMMENDATIONS

MA. Ha Thi Vu Ha*

Abstract: ***Exports have played an important role in promoting economic growth. In recent years, Vietnam's exports have grown strongly. In 2024, Vietnam continued to record many important achievements in export activities, including stable growth in export turnover, making good use of free trade agreements and maintaining a surplus trade balance. According to the Strategy for Import and Export of Goods to 2030, Vietnam aims for an average export growth rate of 6-7%/year in the period 2021-2030, of which the average export growth rate in the period 2021-2025 is 8-9%/year; the average growth rate in the period 2026-2030 is 5-6%/year. The paper assesses the current situation of Vietnam's goods exports in recent times and proposes a number of recommendations to further increase Vietnam's goods export turnover in the coming time.***

• Keywords: *export, free trade agreement, trade surplus.*

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1. Introduction

According to the Strategy for Import and Export of Goods to 2030, Vietnam aims to develop sustainable exports, promote comparative advantages and transform the growth model in depth, effectively use resources, protect the ecological environment and effectively solve social issues. In addition, promote the in-depth shift in the structure of export goods, promote industrialization and modernization; increase the proportion of export products with added value, high science and technology as well as innovation content, green economic products, circular economy, and environmentally friendly products.

In recent years, Vietnam's exports have continued to have impressive results, contributing to a trade surplus for 9 consecutive years. Vietnam's goods exports have made strong progress, shortening the time to achieve new records. After many years of efforts, in 2012, the export turnover of goods exceeded the USD 100 billion mark; in 2017 (after 5 years) it exceeded the mark of USD 200 billion; in 2021 (after 4 years) it exceeded the mark of USD 300 billion. The year 2024 continued to mark many important records for import and export activities. The total value of import and export turnover of goods approaches the USD 800 billion, reaching a record of USD 786.29 billion, higher than the record in 2022. Of which, exports surpassed the mark of USD 400 billion for the first time (after 3 years). This can be considered a remarkable milestone for Vietnam's efforts to develop international trade. These results have brought Vietnam to rank 17th among the 20 economies with the largest trade scale in the world (WTO, 2024).

According to the General Statistics Offices (2025), the world economy is gradually stabilizing as global trade in goods improves, inflationary pressures gradually decrease, financial market conditions continue to loosen, and the labor market recovers positively. These factors will create positive conditions for world economic growth in 2025, which will have a positive impact on the economies of countries around the world, including Vietnam. Along with that, the world economy is currently undergoing a transition between liberalization and protectionism, between multilateralism and bilateralism, especially in the context of unpredictable geopolitical developments. In this context, countries, including Vietnam, always focus on adjusting strategies and policies to participate deeply in the global value chain, enhance export position, exploit trade advantages and foreign investment flows for economic development. In this context, it is neccessary to realize the current situation of Vietnam's commodity exports and make recommendations for Vietnam's good export in the coming time.

2. The role of exports in Vietnam's economy

In Vietnam, export is one of the three important driving forces to promote economic growth, so it is being given special attention by the Government. According to Nguyen Si Dzung (2023), the role of exports in Vietnam's economy is very important as follows:

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First, exports increase national income. Exports are one of the important sources of national income. When exports increase, national income will increase. This helps improve people's lives and promote economic growth.

Second**,** exports create jobs. Exports create many jobs for domestic workers. When exports increase, the demand for labor will increase. This helps solve the problem of unemployment and contributes to poverty reduction.

Third**,** exports promote economic restructuring. Exports help domestic enterprises access international markets. This encourages enterprises to innovate technology, improve competitiveness and shift the economic structure towards modernization.

Fourth**,** strengthen international economic integration. Exports help countries connect more closely with each other. This contributes to promoting economic integration and global economic growth.

3. Current situation

The 6th Party Congress (1986) identified commodity export as one of the three fronts of the economy in the renovation period (alongside food production and consumer goods production). The mid-term conference (7th term) of the Party identified Vietnam's economic development strategy as "Persistently focusing on export as the main direction, while replacing imports of some domestically produced products effectively".

In 2006, to prepare for a new development phase, especially to prepare for joining the WTO, the Prime Minister issued Decision No. 156/2006/QD-TTg dated June 30, 2006 approving the Export Development Project for the period 2006-2010 with the general goal: to develop exports at a high and sustainable rate. Shift the export structure towards promoting the export of high value-added goods, processed and manufactured products, products with high technology and intellectual content, gradually reducing the proportion of raw exports. Controlling a reasonable trade deficit, through promoting the export of goods and services, developing the production of products with comparative advantages to ensure domestic demand, moving towards export-import balance in the early years after 2010.

The period from 2006 to present is the period of Vietnam's deep economic integration with the important event of Vietnam becoming the 150th member of the WTO. Therefore, following the foreign trade policies and strategies of the previous periods, in this period, Vietnam has the orientation of continuing to exploit relative advantages combined with the opportunities of integration to exploit export markets to the maximum and develop new markets.

Table 1: The situation of Vietnam's export

Year	Export (billion USD)	Export growth rate (%)
2015	162,0	7,9
2016	176,6	9,0
2017	215,1	21,8
2018	243,7	13,3
2019	264,2	8,4
2020	282,6	6,9
2021	336,0	18,9
2022	371,3	10,5
2023	354,7	-4,6
2024	405,5	14,3

Source: Compiled by author

In the first period, from 1991 to 2010, Vietnam's annual export growth always reached a high rate, at double digits, even reaching over 15% in some years. In the period from 2011 to 2022, the growth rate of Vietnam's total export value reached an average of 12.6%/year. It can be said that Vietnam has had a high export growth rate for more than 3 decades, even during the COVID-19 pandemic (2019-2021). The export growth rate for the entire period from 1992 to 2022 reached an average of 17.96%/year. Vietnam has become the country with the highest export growth rate in the world for more than 30 years.

The year 2024 will mark many important records for import and export activities. The total value of import and export turnover of goods is approaching the mark of 800 billion USD, reaching a record of 786.29 billion USD, higher than the record in 2022. Of which, exports surpassed the 400 billion USD mark for the first time (after 3 years). These results have brought Vietnam to 17th place among the 20 economies with the largest trade scale in the world. Especially, Vietnam's total export turnover in 2024 continued to maintain positive growth in the context of many risks and uncertainties in the global economy. Preliminary export turnover of goods in 2024 reached USD 405.53 billion, up 14.3% over the previous year. Of which, the domestic economic sector reached USD 114.59 billion, up 19.8%, accounting for 28.3% of total export turnover; the foreign-invested sector (including crude oil) reached USD 290.94 billion, up 12.3%, accounting for 71.7%.

As a result, Vietnam's trade balance in 2024 continue to maintain a high trade surplus. Although imports increased sharply, exports still maintained growth momentum, helping the trade balance maintain a surplus. In 2024, the trade balance of goods had a trade surplus of USD 24.77 billion (the previous year had a trade surplus of USD 28.4 billion)

thanks to stable export growth and reduced imports of non-essential goods. This is the 9th consecutive year that Vietnam's trade balance of goods has achieved a trade surplus.

The diversity of Vietnam's export items and the revenue of export is increasing. If in 1986, Vietnam only had a few export items with low value, then by 2016, Vietnam had 24 items with a value of over USD 1 billion (phones and components: USD 34.32 billion; textiles: USD 23.84 billion; electronics, computers and components: USD 18.96 billion; footwear: USD 13.0 billion; machinery, equipment, other spare parts: USD 10.14 billion; seafood: USD 7.05 billion; wood and wood products: USD 6.97 billion...), and just 6 years later (2022), the group of export items with over USD 1 billion has increased to 48 items.

In 2024, there were 37 items with export turnover of over USD 1 billion, accounting for 94.3% of total export turnover (8 items with export turnover of over 10 billion USD, accounting for 69.0%). Key export items include electronics, computers and components; phones and components; machinery, equipment, other spare parts; textiles; footwear and wood maintain the leading position. Electronics, computers and components continue to be the leading export group in terms of export value, with great contributions from technology corporations such as Samsung, LG, Apple and electronic components manufacturing companies in Vietnam.

The export value of electronics, computers and components in 2024 reached USD 72.6 billion, an increase of 26.6% compared to 2023, accounting for 17.9% of total export turnover. Phones and components ranked second with a turnover of USD 53.9 billion, up 2.9%; machinery, equipment, tools and other spare parts reached USD 52.3 billion, up 21%; textiles reached USD 37 billion, up 11.2%; footwear reached USD 22.9 billion, up 13%; wood and wood products reached 16.3 billion USD, up 20.9%; means of transport and spare parts reached USD 15.1 billion, up 6.4%; seafood reached USD 10 billion, up 11.9%. In 2024, for the first time, there is an item with the export or import turnover of over USD 100 billion. That is electronics, computers and components with an import turnover of USD 107.1 billion, a very high increase of 21.7% compared to 2023, accounting for 28.1% of total import turnover. This is also the leading item among the main export items, reaching USD 72.6 billion, bringing the total export and import turnover of electronics, computers and components to USD 179.7 billion, a sharp increase of 23.6% compared to 2023 (General Statistics Office, 2024).

After nearly 40 years of promoting the "export-oriented" strategy, the structure of Vietnam's export goods has fundamentally shifted, from intensive use of raw materials and primary products to processed and manufactured products. In particular, the strong growth of electronics, computers and components shows that Vietnam is gradually shifting from the production of raw products to products with high added value, especially in the processing, manufacturing and high-tech industries. The development of the electronic components, robot and software manufacturing industry is a clear demonstration of this shift.

The export market is expanding and increasing. In 2024, Asia (including China, Japan, and South Korea) remain the largest consumer of Vietnamese goods. Of which, China remains the market with the largest two-way trade relations, reaching USD 204.9 billion, up 19.2% compared to 2023; of which, exports will reach USD 60.6 billion, down 1.1%. South Korea is estimated to reach USD 81.8 billion, up 7.6%; of which, exports are estimated to reach USD 25.5 billion, up 8.7%. Japan is estimated to reach USD 46 billion; of which exports will reach USD 24.6 billion, up 5.6%.

Key export markets expand and increase. In 2024, Asia (including China, Japan, and South Korea) will remain the largest consumer of Vietnamese goods. Of which, China will remain the market with the largest two-way trade relations, reaching 204.9 billion USD, up 19.2% compared to 2023; of which, exports will reach 60.6 billion USD, down 1.1%. South Korea is estimated to reach 81.8 billion USD, up 7.6%; of which, exports are estimated to reach 25.5 billion USD, up 8.7%. Japan is estimated to reach 46 billion USD; of which exports will reach 24.6 billion USD, up 5.6%.

In addition, the US and EU are also two very important markets, especially in the fields of agricultural exports, textiles, footwear, and electronics. Accordingly, the US ranked second with USD 134.6 billion, up 21.5%; of which, exports reached USD 119.6 billion, up 23.3%. The EU market is estimated at USD 68.8 billion; of which exports are estimated at USD 52.1 billion, up 19.3%.

However, Vietnam's commodity exports are currently facing many difficulties and challenges such as: Risks from global trade wars; Declining demand from major markets; Not yet able to compensate for the decline from China; Difficulties in exporting agricultural and aquatic products; Still

dependent on a number of key products; Difficulties in improving logistics infrastructure, high logistics costs; Fluctuations in exchange rates and interest rates; Incomplete protection of intellectual property and anti-counterfeiting...

4. Recommendations for exporting goods

According to the Strategy for Import and Export of Goods to 2030 approved under Decision No. 493/QD-TTg dated April 19, 2022 of the Prime Minister, Vietnam aims for an average export growth rate of 6-7% per year in the period 2021-2030, of which the average export growth rate in the period 2021-2025 is 8-9% per year; the average growth rate in the period 2026 - 2030 is 5-6% per year. At the same time, increase the proportion of the European market to 16-17% of total export turnover in 2025 and 18 - 19% in 2030; the America market to 32 - 33% of total export turnover in 2025 and 33 - 34% in 2030; the Asian export market is about 49-50% in 2025 and 46-47% in 2030.

To further increase Vietnam's goods export turnover, the author proposes to synchronously and effectively implement the following groups of solutions:

For management agencies

- Continuing to diversify export markets, especially markets such as Africa, the Middle East, and some ASEAN countries.

- Taking advantage of FTA agreements to expand export markets for Vietnam's key and advantageous products to European, Japanese, North American, and Hala markets; participate deeply and enhance position in the world supply chain.

- Continuing to diversify forms of widespread propaganda about incentives in FTAs for import and export enterprises, contributing to improving the efficiency and sustainability of exporting Vietnamese goods to markets that have signed FTAs; encourage enterprises to regularly participate in popular events and promote trade promotion programs.

- Increasing the use of information technology to simplify customs and transportation procedures, helping to reduce costs and time for import and export activities. Electronic systems such as e-ports and online services can help improve work efficiency.

- Continuing to innovate trade promotion activities, focusing on promoting at the highest level the digital transformation program in trade promotion activities, connecting domestic and foreign supply and demand.

- Providing credit packages with preferential interest rates for exporting businesses, helping businesses improve their financial capacity and expand their export scale.

For export enterprises

- Taking advantage of free trade agreements (FTAs): Vietnam's enterprises need to fully exploit the signed FTAs, such as EVFTA, CPTPP, RCEP to increase export turnover and reduce tariffs. Enterprises need to improve their capacity to make the most of these incentives.

- Building a strong national brand: Building and promoting the national brand through international marketing campaigns, trade fairs and international events will help increase the brand value of Vietnamese products, thereby expanding export markets.

- Improving the quality of exported goods, especially focusing on product traceability, improving labor productivity; reducing the cost of exported goods, improving price competitiveness and product quality in the world market, especially for Vietnam's key export products.

- Strengthen training for businesses: Export enterprises need training support to understand international regulations, improve quality management and meet the requirements of demanding markets such as the EU and Japan.

5. Conclusion

The increase and spectacular results of Vietnam's exports have not only contributed significantly to GDP growth and improved foreign trade balance, but also improved the quality of economic growth, created jobs, expanded economic and cultural integration, and enhanced Vietnam's position in the international arena. In order for exports to continue to be an important driving force for economic growth, Vietnam need to promote institutional reform, create a favorable business environment for enterprises; support enterprises to improve their competitiveness, meet the requirements of the international market; strengthen trade promotion, and expand export markets.

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VOCATIONAL TRAINING EXPERIENCE IN ASOCIATION WITH SOLVING EMPLOYMENT CHALLENGES FOR RURAL WORKERS IN VARIOUS COUNTRIES AND SOME RECOMMENDATIONS FOR VIETNAM

PhD. Nguyen Thanh Thao*

Abstract: ***In Vietnam, the proportion of the agricultural workforce receiving vocational training remains low compared to the overall agricultural labor force and the demand within the sector. The structure of vocational training programs is not yet well-aligned with the agricultural restructuring progress and rural development. Studying the vocational training experience and policies for rural workers of several developed countries, such as China, South Korea, Japan, Thailand, the Netherlands, and Australia, can provide valuable insights and recommendations for Vietnam. These insights can help guide the country in refining its vocational training strategies to solve employment challenges, facilitate labor market transitions in rural areas, and achieve breakthroughs in modernizing agriculture and rural industry by leveraging existing culture, traditions, and resource advantages.***

• Keywords: *vocational training, rural workers, apprenticeship, vocational training for rural workers.*

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1. Vocational training for rural workers

Vocational training refers to the teaching and learning activities designed to equip learners with the necessary knowledge, skills, and professional attitudes to secure employment, create their own jobs after completing the course, or advance their career (Vocational Education Law, 2014).

From this perspective, vocational training encompasses two closely interconnected and inseparable processes: vocational training and apprenticeship. *Vocational training*, in a general sense, refers to the comprehensive set of activities aimed at imparting occupational skills to learners. More specifically, it is the process by which instructors convey both theoretical and practical knowledge to students, enabling them to develop proficiency, skills, and dexterity in their profession. *Apprenticeship* involves the process by which learners absorb theoretical and practical knowledge, ultimately achieving a certain level of professional competence.

Vocational training for rural workers involves teaching and learning activities designed to equip rural workers with the necessary knowledge, skills, and professional attitudes to meet the demands of rural economic and social development. It is a purposeful process aimed at enhancing the quality of the rural workforce to support rural industrialization and modernization. This is a coordinated set of decisions made and implemented by the government, targeting specific object groups to improve the quality of rural labor, thereby achieving economic and social development goals, particularly in the agricultural sector. The primary focus of vocational training for rural workers is on practical skills, alongside essential knowledge and professional skills related to industry and services, often with a particular emphasis on specialized areas within agriculture, forestry, and fisheries.

Vocational training policies for rural workers are state-led strategies and solutions aimed at equipping rural laborers with the necessary knowledge, skills, and professional attitudes to meet the demands of rural economic and social development *(Ta Thi Bich Ngoc, 2023)*.

2. Some International Experience

2.1. The experience of China

China is one of the world's largest agricultural producers, with a population exceeding 1.4 billion, including 551.92 million people living in rural areas (39.4% of the population). The rural workforce comprises 332 million employed individuals *(China Statistical Yearbook, 2020)*. The country is home to a significant number of professional farmers who

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are well-educated, possessing deep agricultural knowledge and strong business skills *(Institute of Policy and Strategy for Agriculture and Rural Development, 2020).*

Firstly, China has effectively implemented policies aligned with the directives and strategies of the Communist Party of China. The Party has outlined rural reform and development policies within its broader strategy for urban and rural economic and social development, encapsulated in the "Tam Nong - Three Rural Issues" policy *(agriculture, farmers, and rural areas).* Additionally, various policies related to comprehensive rural development have been introduced, focusing on infrastructure, and improving the rural workforce. Enhancing the quality of human resources is considered central to the *"Three Rural Issues"* policy, addressing employment, labor structure transitions, and labor mobility, particularly the shift from rural areas to non-agricultural sectors.

Secondly, China has identified key pillars in vocational training that are linked to labor restructuring. The country's vocational training policy for rural workers is connected to labor restructuring and addressing employment, and is built on four main pillars: (1) vocational training for agricultural production, (2) vocational training for non-agricultural sectors such as food processing, handicrafts, and ecotourism, (3) training in marketing skills and small-scale agricultural trade, and (4) the establishment of small and medium-sized rural enterprises to attract and retain local labor *(https://dangcongsan.vn).*

Thirdly, China has established clear principles for vocational training linked to rural labor restructuring and addressing employment. The country's vocational training for rural workers follows 4 guiding principles:

(1) Bringing employment education to villages and communes;

(2) Demand-driven vocational education;

(3) Standardization of educational activities;

(4) Strict management of vocational training.

The objective of these principles is to create favorable conditions for farmers, enabling them to find time and opportunities for learning. Vocational training programs are designed seasonally, catering to specific fields and the needs of learners, thereby fostering motivation and encouraging creativity. The management criteria for learners are rigorously enforced to ensure the effectiveness of both teaching and learning processes. The action program *'One Million Chinese Students Return to Work in Rural Areas for Two Years'* was implemented. The evaluation and verification of the workmanship of professional farmers are conducted by local authorities and recorded in a digital database for easy access by managers when necessary *(https://nongnghiep.vn).*

China has diversified training methods: formal, informal, integrated, and distance learning programs. An emphasis is placed on training through television channels, which the Chinese government considers a primary method for professional agricultural technical education, career transition training, and dissemination of market knowledge and policies to farmers. In addition, there is support from an extensive radio network that connects central to local levels. Basic education for the general workforce is being strengthened, with priority given to developing high-quality talent at universities and research institutes. Special attention is also given to training technical and specialized talents through the network of key secondary schools *(Institute of Policy and Strategy for Agriculture and Rural Development, 2020).*

Fourthly, China has effectively implemented vocational training projects that are closely linked to the restructuring of rural labor and addressing local employment. Under the slogan "*Everyone Should Have Knowledge*," workers who are untrained or have low skill levels are encouraged to participate in training programs. The "*Light Program*" focuses on providing training and career guidance for rural workers. The "*Thousands of Villages Project*" aims to establish retail stores in rural areas, with the dual objectives of creating jobs for rural laborers and delivering high-quality products to farmers

Fifthly, China has undertaken projects to develop enterprises, cooperatives, and leading associations in the agricultural production sector, with the goal of "One Commune, One Enterprise; One Town, One Product." China has increased investment in rural infrastructure and eliminated tuition fees in rural areas. The Ministry of Civil Affairs, in collaboration with the Ministry of Labor and Social Security, has participated in vocational training for rural workers, training an average of about 1 million laborers from disadvantaged regions each year. In mountainous and remote areas, vocational training is provided, and workers are then sent to more developed economic regions to find employment *(https://www.hids.hochiminhcity.gov.vn)*

The government has allowed training institutions to offer skill development courses and has encouraged citizens to start their own businesses. Efforts have been made to restructure the local labor force and create employment opportunities for workers migrating from urban areas back to rural regions during times of crisis. Through the rural labor mobility policy, up to 50 million farmers have received training. Administrative processes for establishing businesses have been simplified, with business registration fees waived, and graduates are encouraged to return to their hometowns to start enterprises. The government has also strengthened cooperation between vocational training institutions and employers, helping to increase the formal employment rate in the agricultural sector. *(https://tcnn.vn)*.

2.2. The experience of Japan

Japan has been facing a severe labor shortage due to its aging population and the widening gap between urban and rural areas. In response, Japan has intensified its efforts to develop rural education and vocational training to enhance the quality of the workforce, aligning it with the needs of non-agricultural industries. Despite being a highly developed industrial nation, Japan's journey toward industrialization and modernization began with significant advancements in agriculture.

Firstly, Japan has implemented universal education that the population of compulsory age must complete compulsory education for a period of 6 to 9 years. The Japanese government established the School Education Law and Basic Education Law in the late 1940s, and by the 1980s, universal education had been widely adopted. Notably, since the 1960s, Japan has set out a direction for the development of selective agricultural production, refining agricultural structures, and developing farming households and cooperatives with strong management and cultivation capabilities. Consequently, Japan has built a comprehensive national network for agricultural education, research, and experimentation, including over 60 agricultural universities and more than 600 technical agricultural schools, with about 40% of young people enrolling in Agricultural Universities. Japan emphasizes vocational training prior to employment to enhance the quality of its workforce and ensure laborers can adapt to market demands. Various training programs are provided to rural workers, equipping them with the necessary skills to meet the needs of the market.

Secondly, vocational training for rural workers in Japan focuses on equipping them with skills in production, farm household management, scientific and technological knowledge, and understanding market demands through the development of cooperative models. The Japanese government supports skilled rural laborers by facilitating their accumulation of land, enhancing production, and enabling them to become professional farmers who manage and circulate goods through cooperatives *(Nguyen Hong Thu, https://iasvn.org)*. In Japan, most farmers voluntarily join cooperatives. This model operates multi-functionally in terms of business operations, without being limited in terms of scale. These multi-functionally cooperatives engage in various activities, including marketing, supply provision, money transfer, insurance, vocational training, and agricultural business guidance for members. Promoting agricultural skills and enhancing professional competencies are the main contents of the agricultural operation guidelines. Cooperatives undertake vocational training and technical dissemination, establish agricultural advisory groups, and work to integrate cooperative activities with administrative bodies, agricultural research institutions, veterinary officials, and other scientific research groups.

Thirdly, vocational training for farmers focuses on traditional product processing skills. Adhering to the principle of 'One Village, One Product,' Japan not only maintains and develops its traditional products but also emphasizes the creation of new ones. Farmers in artisanal villages have been innovative in combining production with community and eco-tourism, fully exploiting the inherent potential of their localities.

Fourthly, Japan efficiently mobilizes resources for the vocational training of rural laborers. The Japanese Agricultural Cooperative Law stipulates that 'all cooperatives must allocate 5% of their annual profits to vocational training for their members and staff' to enhance their knowledge and skills, thereby benefiting the cooperative itself. Cooperatives have dedicated training funds and provide financial support to encourage members and staff to participate in external training programs *(Institute of Educational Science, 2013)*. Additionally, the Japanese government focuses on investing in agricultural science and technology, promoting a tripartite linkage between researchers, producers, and farmers. This approach helps farmers access

advanced technologies, boosts labor productivity, and supports sustainable agricultural development.

Fifthly, Japan integrates vocational training with employment and migration solutions. Alongside agricultural production development, Japan prioritizes the growth of industries and services in rural areas to address employment for agricultural laborers and the migration of people from rural to urban areas. The development of industrial parks and export processing zones in suburban areas aims to stimulate rural development and foster modern enterprises in rural regions. Investments are made in infrastructure such as seaports, highways, and telecommunications systems to attract investment into rural areas, create local jobs, reduce labor migration, and stabilize the labor market and social conditions *(Nguyen Quoc Dung, 2020).*

2.3. The experience of Korea

Implementation of the national economic and social development strategy, South Korea has focused on rural development since the early 1960s, particularly emphasized the building and enhancement of rural human resources to support the "New rural development" movement. Vocational training which is linked to labor restructuring and addressing employment is reflected in the following aspects:

Firstly, vocational training aims to shift rural residents' mindset towards self-reliance with government support. By investing in the training of project management staff, the government has increased its investment in vocational training for rural laborers. This helps individuals build confidence in their abilities, encouraging them to be proactive and innovative in rural development efforts and to effectively utilize their trained skills. The combination of material support and vocational training, along with the development of open and flexible policies, is intended to motivate people to fully harness their existing potential. Education and training drive the enhancement of human resources quality; vocational training helps individuals understand and implement rural development projects, improve income, and elevate their professional skills. The government also focuses on creating and spreading advanced models in the new rural movement and exemplary cooperatives in villages and towns *(https://truongchinhtrithanhhoa.gov.vn).* The Government has built a strategy for developing human resources in agriculture and rural areas with the goal of helping people to be confident in themselves in the face of difficulties so that they can be more proactive, positive, and creative in their work. *(Institute of Policy and Strategy for Agricultural and Rural Development, 2020).*

Secondly, specialized training and the transfer of technical skills and work competencies to laborers should align with the development needs of various economic sectors. The state, businesses, and economic organizations all share the responsibility of transferring knowledge, vocational training, and work skills to farmers, enhancing their production capabilities and boosting labor productivity. Based on the long-term, medium-term, and short-term economic development orientations of the country in general and the region in particular, localities should proactively provide vocational training to improve the quality of human resources and meet the economic demands of specific industries and sectors. The government should invest comprehensively in establishing vocational training facilities and enhancing the skills and expertise of the workforce. Continuous monitoring and timely adjustments to vocational training efforts should be made, aligning with labor restructuring and labor mobility in the context of Industry 4.0 to address practical challenges in agriculture.

Thirdly, appropriate credit policies are in place to support young workers and those new to the profession. The government covers training, consulting, and guardian costs for participants in these programs. During high school, vocational subjects are integrated into the curriculum to help develop a young workforce with a basic understanding and professional skills in emerging economic sectors *(Vi Van Hung, Nguyen Thi Linh Huong, 2013).* South Korea focuses on young agricultural workers by facilitating their access to new professions and has policies to appoint highly skilled professionals as consultants and guardians for inexperienced young workers involved in agricultural production *(Institute of Policy and Strategy for Agriculture and Rural Development, 2020).*

Fourthly, vocational training should be linked to urbanization efforts to reduce developmental disparities between rural and urban areas. The strategy for industrialization and modernization began in the 1960s with a series of coordinated policies, including the 'Agricultural and Fisheries Successor Training Fund Law,' the 'Rural Revitalization Law,' the 'Local Industry Development Law,' and the

'Rural Industrialization Plan.' Initially, these policies focused on training related to local enterprises within the scope of 'households.' By the 1970s, the 'New Village Movement' shifted its focus to developing large-scale enterprises with various incentives. These businesses played a significant role in creating employment opportunities for rural workers in South Korea.

2.4. The experience of Thailand

By the year 2000, Thailand was still considered a traditional agricultural country with 80% of its population living in the rural areas. However, recent strong economic development has shifted the focus from agriculture to industrial and service sectors, leading to significant changes in the labor market. Despite this shift, agriculture remains a major source of employment, accounting for approximately 40% of the labor force and contributing around 10% to the country's GDP *(https://vinanet.vn)*. This outcome reflects the substantial efforts and contributions made through vocational training.

Firstly, Thailand has implemented a series of strategies related to vocational training for rural labor, linking vocational training with production and marketing of agricultural products. To promote learning and enhance the skills of its people, the government has established vocational training programs and specialized courses in agriculture and rural development. This includes strengthening the role of individuals and organizations in the agricultural sector, applying scientific and technological advancements to farming, and enabling farmers to access new technologies. Since 2013, the Thai government has launched the "Smart Agriculture" project, with over 90% of Thai farmers using machinery and equipment in agricultural production *(https://www.khuyennongvn.gov.vn)*. The government has also enacted policies that integrate vocational training with production and marketing of agricultural products to enhance competitiveness, while simultaneously investing in infrastructure development to support agriculture and rural areas, thus addressing much of the surplus labor in rural regions.

Secondly, Thailand has strengthened its efforts to train and retrain the workforce to meet the demands of agricultural production in alignment with the changes brought about by Industry 4.0. Through vocational training programs about food processing, handicrafts, eco-tourism, marketing skills, and small and medium-sized agricultural businesses, as well as support for establishing enterprise; concurrently, the government has implemented strategies to transform growth models and economic development, shift economic and labor structures, and promote the growth of processing industries, services, and tourism, thereby enabling Thai farmers to secure employment after apprenticeship *(https://dangcongsan.vn)*. Thailand emphasizes enhancing scientific and technological skills for rural workers to address labor shortages in the industrial and service sectors moving into rural areas. As of 2020, Thailand had nearly 200 organizations providing training and technical education for rural labor, with a capacity of up to 5,000 students per year *(Nguyen Quoc Dung, 2020)*.

Thirdly, Thailand has revamped its economic growth model by developing key sectors in agriculture and integrating traditional products based on local resources and cultural advantages. This strategy involves restructuring industries to support rural industrial development while considering the availability of resources and traditional production skills. It focuses on developing key industries for export and promoting the processing of agricultural products. The successful implementation of the 'One Village, One Product' program and the 'Village Fund' program has contributed to this effort. Additionally, the growth model has shifted towards services, leading to a transition of the labor force from agriculture to service activities, particularly rural tourism and eco-tourism, by leveraging the region's cultural, traditional, and natural resources.

2.5. The experience of Netherlands

The Netherlands has the lowest per capita arable land area in the world, at just about 0.58 hectares per person. Despite this, it boasts a highly developed and competitive agricultural sector, supported by excellent infrastructure and advanced scientific knowledge. To achieve these results, the Netherlands government has implemented several strategies for developing high-quality agricultural human resources, particularly through a comprehensive agricultural education policy. Netherlands agricultural education is divided into four levels:

(1) Primary education in agriculture, which lasts 4 years, is taught in general schools or gardening, and can be shortened depending on the actual situation;

(2). Secondary education in agriculture, taught in general schools and gardening, lasts from 1.5 to 3 years, depending on the program of each school;.

(3). Higher education in agriculture: Available at agricultural colleges and universities, with 3 to 4-year programs;

(4). Agricultural Science Education: Conducted at Wageningen University, with a 6 to 7- year program.

These educational institutions and programs are developed by the government, private, or social organizations. Students in these schools pay a very small fee, and Dutch agricultural education emphasizes practical experience and skill development.

2.6. The experience of Australia

The Australian government has directed the development of its agriculture sector as an industry. Even though arable land constitutes only 1% of the continent's total area and the harsh natural conditions such as limited rainfall and frequent droughts the agricultural workforce is relatively small, making up about 4% of the country's total labor force. Nonetheless, Australia ranks among the top in the world for self-sufficiency in food. Since the 1990s, the Australian government has focused on investing in agriculture with the goal of achieving self-sufficiency. This includes organizing production in farm settings with highly educated and skilled workers (31% hold university or college degrees). The government has implemented the program "Advanced Agriculture Aimed at Export" with the following specific objectives:

(1) Enhance Farmers' Participation in Learning Activities: To improve competitiveness and promote sustainable development.

(2) Vocational Training to Change Farmers' Attitudes: To highlight the benefits of training and develop skills aligned with farm management needs.

(3) Further Skills Development: To improve farmers' abilities in engaging with learning activities that are practical and suited to their real-life circumstances.

(4) Financial Support for Farmers: To assist them in participating in training programs focused on natural resource management and financial management skills.

(5) Provide Information: To help farmers stay informed about market fluctuations both domestically and internationally, enabling them to adapt to unpredictable changes.

3. Some recommendations for Vietnam

Experience in vocational training associated with addressing employment and rural labor restructuring of some countries gives Vietnam the following policy recommendations:

Firstly, *it is essential to raise awareness among rural laborers about the importance of vocational training. They must recognize that vocational training is a crucial and foundational element in the process of building new rural areas and successfully achieving rural industrialization and modernization, both locally and nationally.* Every country integrates vocational training into its human resource development strategies, encompassing short-term, medium-term, and long-term plans, and allocates optimal resources to this critical task. Farmers must deeply understand the role of vocational training to develop self-improvement plans that align with the basic job requirements of the labor market. The government should maximize opportunities for citizens to access vocational training programs that are consistent with the industrialization and modernization strategies, particularly in the context of international economic integration and the Fourth Industrial Revolution. This includes accelerating research and the application of science and technology to create breakthroughs that modernize agriculture and rural industries.

Secondly, *it is essential to refine the legal documents related to vocational training for rural laborers.* Government advisory headquarters need to conduct thorough investigations to understand the apprenticeship needs of rural workers, ensuring alignment with policies, plans, and socio-economic development strategies to issue legal documents that meet market demands. Implementing measures to address employment and rural labor restructuring must be done in accordance with specific resolutions of the Central Committee and the Government. This includes refining laws that relate to vocational training, such as the Vocational Education Law and the Employment Law, as well as decisions on support and loan programs for vocational training and self-employment, tuition policies, the Prime Minister's vocational training plan for rural laborers, lifelong learning initiatives, and national programs for building new rural areas and sustainable poverty reduction. Revisions and updates should ensure that legal documents protect workers' rights before, during, and after vocational training. Additionally, policies, educational systems, output standards, and the recognition of vocational qualifications should all be improved.

Thirdly, *vocational training must be integrated within a unified system of education, workforce development, and talent cultivation.* Vocational training policies should be incorporated into the national education and training system. There should be a focus on orienting high school students towards agricultural vocational training, starting with pilot programs and progressing towards the broader implementation of vocational subjects in the high school curriculum. This approach aims to train a young workforce with the knowledge and flexible skills necessary to support economic restructuring and address employment needs. Vocational training must also be closely aligned with economic restructuring, particularly during the adjustment and expansion of new professions, efforts should be made to retrain the inappropriate workforce to enhance their opportunities in accessing new sectors and employment.

Fourthly, *vocational training must be closely linked to addressing employment and the attraction of local employment opportunities, while also encouraging workers to return to rural areas to establish careers.* Policies, plans, and development strategies should focus on economic and social infrastructure, improving the business investment environment, and offering incentives to attract investors into agriculture and related services. This approach will generate new local jobs, attract urban workers back to rural areas, and encourage rural workers to return and settle. These efforts can narrow the development gap between urban and rural areas, reduce rural-to-urban labor migration, and potentially create a reverse migration trend. Emphasis should be placed on the synergy between the "three parties"- the state, training institutions and businesses-in vocational training, particularly in fostering bilateral cooperation between training providers and employers. Japan's cooperative model serves as a valuable lesson, highlighting the strength of rural community organizations in production consulting, vocational training, and enhancing the quality of human resources. This model nurtures talent within a disciplined and responsible workforce that supports each other in their work.

Fifthly, *strengthening the role of government oversight in vocational training for rural workers is essential.* The state must regularly inspect, monitor, and review the implementation of vocational training policies for rural labor. It is crucial to enhance the effectiveness of policy direction and management, restructuring the vocational education system towards greater autonomy and accountability. Transparency in admissions and recruitment, particularly concerning rural labor, should be prioritized. Regular and systematic supervision of vocational training activities for rural workers must be conducted in accordance with legal regulations. Additionally, managing the labor market in general and the vocational training service system in particular should be based on the application of advanced, modern information technology to track economic restructuring and promptly adjust training programs accordingly.

Sixthly, *mobilizing and utilizing appropriate resources successfully implement vocational training policies for rural workers.* In addition to state investment resources, there should be a focus on socialization policies and public-private partnerships in vocational training activities, especially encouraging enterprises to engage in self-training and retraining for rural workers. The role of individuals and organizations in vocational training for rural workers must be strengthened to create local jobs and facilitate the labor restructuring from agriculture to industries, services, and tourism, leveraging culture, tradition, and available resources.

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FISCAL POLICY FOR THE DIGITAL ECONOMY: INTERNATIONAL EXPERIENCES AND RECOMMENDATIONS

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Abstract: ***In the context of a rapidly developing digital economy, fiscal policy needs to be adjusted to ensure efficiency, fairness and sustainability. This article explores the fiscal policies of various countries in the context of the digital economy, focusing on tax strategies and budget allocations. The article analyzes how countries are redesigning tax systems to collect taxes from digital transactions and examines government spending on digital infrastructure and innovation, highlighting the important role The importance of strategic investments in facilitating digital transformation.***

• Keywords: *digital economy, fiscal policy, tax policy, budget spending…*

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Introduction

The digital economy is fundamentally transforming the global landscape, driving innovation and reshaping the way businesses and governments operate. As digital technologies permeate every industry, they have far-reaching consequences for fiscal policies around the world. This transformation requires national fiscal frameworks to adapt to exploit the benefits of digitalization while mitigating its challenges. The objective of this article is to examine how countries adjust their fiscal policies to develop in the new context of the digital economy and draw important lessons for Vietnam in optimizing its strategies. its fiscal strategy facing similar challenges and opportunities.

In the digital age, traditional economic activities are increasingly supplemented or replaced by digital services, transcending physical and national boundaries, complicating traditional frameworks of taxation and spending. labour. This study first examines the fiscal policies that countries have adopted to manage tax collection on digital goods and services. It focuses on innovative approaches such as the introduction of Digital Services Tax (DST) and restructuring the tax system to better capture the value created in the digital economy. Particular attention is paid to the ways in which these measures comply with international tax rules and regulations, aimed at preventing double taxation and encouraging fair competition.

Furthermore, the study discusses how Governments reallocate resources to support the digital transformation of their economies. Investment in digital infrastructure, education and innovation is essential to fostering an environment conducive to a thriving digital economy. This discussion extends to considering budget strategies that help accelerate the adoption of digital technology by public sectors, improve public service delivery and promote digital inclusion among citizens.

Drawing on a synthesis of international experience and ongoing reforms, this article provides a comprehensive analysis tailored to Vietnam's current economic and financial context. It proposes strategic recommendations for Vietnam to refine its fiscal policies, emphasizing the importance of approaches that appropriately integrate tax strategies with broader economic objectives, including including sustainable development and inclusive growth in the digital era. Through this exploration, the study aims to contribute to the global discussion on fiscal policy in the digital economy and provide actionable insights for policymakers navigating in developing countries. water.

International experience

Tax policy

In China, within the framework of China's digital economic policy, the application and adjustment of taxes on digital business activities such as e-commerce and digital services has

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become an important part. in supporting and managing the growth of businesses in this field. China has taken many specific measures to adapt to changes and challenges from the digital economy, especially through tax policies and digital development initiatives. China's tax policy on e-commerce and digital services has been adjusted to encourage the development of new technology industries and support businesses in expanding and competing internationally, international. Specifically, value-added tax (VAT) policy has been applied flexibly to suit electronic business models, while improving the tax collection system to include cross-border electronic transactions. world, to prevent tax loss and enhance tax fairness. In addition, China has also developed policies to enhance the ability to manage and collect taxes from digital business activities. For example, the Government has implemented plans to improve digital infrastructure and data management systems to support tax collection and manage income from digital business activities more effectively. These efforts by China to adjust tax policy for the digital economy are not only to promote economic development but also to ensure fairness and transparency in the tax system, creating favorable conditions for businesses sustainable development in the digital era. China continues to affirm its commitment to developing a strong digital economy and deeply integrating into the global economy.

In the UK, in the current digital economy context, they have applied Digital Services Tax (DST) from April 1, 2020 with a tax rate of 2% on revenue from services. search services, social networks and online exchanges that gain value from UK users. This is intended to ensure that large multinational enterprises contribute fairly to supporting essential public services, reflecting the view that current corporation tax rules are no longer suited to the way value in the digital economy. However, DST is considered a temporary measure while the UK and OECD member states work to develop a global solution to address the tax challenges posed by economic digitalisation. The UK government has pledged not to impose DST if a suitable international solution is proposed. In addition, the UK is also preparing to apply the OECD Model Reporting Rules for digital platforms, starting from January 2023. This will require digital platforms to report detailed income Sellers' income on their platforms to tax authorities and sellers, to increase transparency and help governments better understand how these platforms operate and collect taxes effectively. With these policies, the UK is seeking to effectively exploit revenue from digital economic activities, while ensuring that digital businesses contribute fairly to society, in accordance with the value they create. out locally.

In African countries, in the current digital economic context, they have developed tax policies to collect income from digital economic activities, including e-commerce and technical services, number. These policies are intended to deal with the unique challenges of the digital economy, where digital transactions often have no specific location, making it difficult to determine revenue sources and effectively collect taxes. African countries have moved to impose direct and indirect taxes on digital transactions. Direct taxes are typically imposed in the form of Digital Services Tax (DST), while indirect taxes are typically Value Added Tax (VAT) expanded to include digital services. Although much progress has been made, many challenges remain in terms of effective tax collection mechanisms due to the complex nature of digital transactions. Countries such as Kenya, Nigeria, and Zimbabwe have introduced digital services taxes on business activities that do not have a physical presence in their countries, aiming to attract revenue from multinational companies operating in the country. online. Despite certain progress, lack of uniformity in tax policy and difficulties in tax collection management remain major obstacles for tax authorities in Africa. To overcome these problems, international cooperation and the development of technology-based solutions are needed to increase transparency and tax collection efficiency. Through the application of modern and effective tax policies, African countries can take full advantage of the benefits from the digital economy, while ensuring fairness and sustainability in tax collection to support economic development. widespread economic and social development. Wide consultation with stakeholders is also necessary to ensure that tax policies are designed in a reasonable, fair and effective manner, contributing to the sustainable development of the digital economy in Vietnam Africa.

In Australia, they have made a lot of progress in digitizing the tax administration system. The Australian government has deployed mobile applications and virtual support systems to facilitate taxpayers in declaring and paying taxes online. These applications not only help reduce time and costs but also increase the efficiency and transparency of the tax system. The Australian Taxation Authority has invested heavily in training and capacity building for staff, while also developing information technology infrastructure to effectively manage complex digital transactions. In particular, Australia has pioneered the application of artificial intelligence (AI) and machine learning (ML) to improve tax data analysis and management.

In Brazil, they have developed many digital tools to enhance interaction between tax authorities and taxpayers. One of Brazil's key initiatives is the use of virtual assistants and chatbots to provide support and advice to taxpayers. These tools not only help reduce the burden on tax authorities but also improve taxpayers' experience, creating favorable conditions for them in the tax declaration and payment process. Brazil has also deployed digital solutions to improve tax data management and analysis capabilities, helping tax authorities detect and prevent tax fraud more effectively.

Many countries in the European Union have widely adopted virtual assistants and chatbots to assist taxpayers, improve tax relationships and generate positive fiscal effects. Countries such as France, Germany and the Netherlands have deployed advanced digital tax management systems, allowing taxpayers to declare and pay taxes easily and efficiently through online platforms. These tools not only help reduce time and costs but also increase transparency and accuracy in the tax collection process. In addition, EU countries are also actively implementing new technologies such as blockchain and AI solutions to improve tax administration efficiency.

Budget spending policy

Germany has proactively invested in digital infrastructure to enhance global competitiveness and meet the needs of the digital economy. Recognizing the importance of strong digital connectivity, the German government has set a goal of expanding its gigabit broadband network nationwide. By 2025, Germany plans to establish gigabit networks nationwide, significantly improving fiber optic coverage to ensure every area, including rural areas, has access to high-speed internet. This initiative reflects Germany's commitment to upgrading its digital infrastructure not only to support current needs such as Industry 4.0 and automated driving technology but also to promote the long-term development of digital economy. Germany has made significant investments in expanding its fiber network, with Deutsche Telekom leading the effort to expand one of Europe's largest cable networks, including plans to add thousands of kilometers of cable each year. Furthermore, Germany's strategy includes public-private partnerships and federal funding to address infrastructure challenges, especially in hard-to-reach areas. This strategy ensures that the benefits of digitalization are distributed evenly across the country, thereby supporting a wide range of economic activities from technology startups to established industries. Thus, it can be seen that strategic investments in Germany's digital infrastructure are an important part of the national economic strategy, to promote innovation and ensure competitive advantage. in global markets and ensure that their economies remain strong amid rapid global economic and technological changes. These efforts are not only important for economic growth but also help improve people's quality of life by providing reliable access to digital services.

In China, in the context of a strongly developing digital economy, China's budget spending policy has witnessed significant changes, especially in the field of investment in digital infrastructure. According to a study from the International Finance Corporation, China has invested more than $1 billion in the telecommunications, media and technology sectors, typically in the expansion of 4G networks and fiber optic infrastructure. This investment not only aims to improve network connectivity but also support the development of enterprise technologies and cloud infrastructure, thereby promoting digital economic growth. In addition, within the framework of the Global Infrastructure Initiative at the G7 Summit, China has also supported the development of the Lobito Corridor, with a commitment to initially invest in railway projects to connect the Republic of Korea Democratic Congo and Zambia to the global market through Angola. This project not only

aims to expand transportation infrastructure but also includes investment in digital infrastructure, demonstrating China's efforts to promote transportation and infrastructure number. Through these policies, we can see that China attaches importance to integrating financial policy with the development of digital infrastructure, not only to promote economic growth but also to improve improve people's quality of life and increase access to digital services. Vietnam and other countries can refer to these models to develop and deploy policies to support digital infrastructure, to optimize benefits from the digital economy for economic development and society.

In the UK, the Government has invested £400 million in the Digital Infrastructure Investment Fund, which aims to expand and improve the all-optical broadband network. This effort reflects the Government's target to achieve gigabit broadband coverage for at least 85% of households by 2025 and 99% by 2030. This investment is not only about improving connectivity but also Support for the creative and high-tech industries in the UK. Experts at PwC estimate that the investment opportunity in digital infrastructure in the UK could be as high as £100 billion over the next decade, reflecting the strategic importance of investing in technology digital to promote economic growth and innovation. Besides physical infrastructure, the UK is also investing in computing and big data processing capabilities to support cutting-edge technologies such as AI and the Internet of Things (IoT), which are essential for most Research fields range from biology to physics. These efforts not only aim to maximize the potential of AI, but also help solve global challenges such as climate change and new drug development.

Lessons for Vietnam

In the context of strong development of the digital economy, Vietnam is facing great opportunities and challenges in adjusting fiscal policy to accommodate these innovations. To take full advantage of the benefits from the digital economy, Vietnam needs to deploy a comprehensive approach in designing new tax tools and budget spending.

Regarding taxes, the introduction of Digital Services Tax (DST) is an important initiative to collect taxes from digitally active multinational enterprises with no physical presence in Vietnam. This not only helps ensure state budget revenue but also ensures fairness between domestic and foreign businesses. Vietnam needs to work closely with international organizations such as the OECD to ensure tax policies are updated, avoid duplicate taxation and do not negatively affect international business and investment activities.

Regarding budget spending, Vietnam needs to focus on investing strongly in digital infrastructure. This investment not only includes building and upgrading information technologies but also includes investing in new technologies such as artificial intelligence (AI) and Internet of Things (IoT). These technologies will help improve the efficiency of management and monitoring of public resources and services, and promote the development of digital industries. In addition, supporting small and medium-sized enterprises in the digital transformation process through preferential loans and consulting support is also extremely important, in order to enhance the sustainability and adaptability of their businesses. economy.

These policies not only aim to increase efficiency and transparency in public financial management but also contribute to ensuring the country's sustainable development in the digital era. Vietnam needs to continuously update and adjust its policies to adapt to the rapid changes in the global economy and digital technology, ensuring that both taxes and budget expenditure are used appropriately as effectively as possible.

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DO MACROECONOMIC UNCERTAINTY FACTORS CAUSE BANKING INSTABILITY? EVIDENCE FROM AN EMERGING ECONOMY

PhD. Le Ha Diem Chi* - PhD. Nguyen Hoang Vinh Loc*

Abstract: ***The study examines whether instability in macroeconomic factors, such as economic growth, inflation, and money supply, causes Vietnamese commercial banks to be unstable. The OLS regression method only gives a result showing the positive or negative impact of the independent variable on the dependent variable. However, with quantile regression, the bank stability level is divided into many small quantiles, and for each quantile, there is a regression function. The quantile regression results show that GDP growth uncertainty negatively affects banking stability at low quantiles of bank stability; however, in the high quantiles, GDP growth uncertainty has an insignificant impact on bank stability. The results imply that the more volatile the economic growth is, the more unstable the bank will be if banks have low stabilization. However, if banks have high stability, economic growth uncertainty does not affect banking stability. The results of money supply M2 uncertainty impact on bank stability are similar to GDP growth uncertainty. Moreover, high inflation uncertainty reduces bank stability in most of the quantiles of the bank stability.***

• Keywords: *macroeconomic uncertainty; bank stability; quantile regression; GDP growth uncertainty.*

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1. Introduction

There are numerous definitions of financial stability. Most of them have in common that financial stability is about the absence of system-wide episodes in which the financial system fails to function (crises). It is also about resilience of financial systems to stress. (worldbank.org, 2023). Financial stability can also mean a condition in which the three components of the financial system -- financial institutions, financial markets, and financial infrastructure - are stable (bok.or.kr, 2023). Financial institutions are mainly composed of commercial banks. Therefore, a financial institution's stability is bank stability. A stable bank will increase its ability to withstand shocks and reduce the risk of disruption to the business cycle, ensuring banks' cash flow and profits. Bank stabilization creates a more favorable environment for investors and depositors, providing lending capital at a stable price to borrowers. Bank stability depends on macroeconomic factors such as foreign direct investments, money supply, interest and exchange rates, inflation, money supply, and both micro factors. When both macro and micro uncertainty factors happen together, they will strongly affect the bank's business (Bayar & Ceylan, 2017). Rising uncertainty of any form increases information asymmetry since the characteristics of borrowers become opaque. Lenders increasingly struggle to distinguish credit risks during uncertain times, leading to a decline in lending and investment and, consequently, a contraction in economic activity (Phan et al., 2021). Uncertainty typically increases during economic downturns and decreases as the economy improves. Unfavorable fluctuations in the economic environment increase the instability of micro or macroeconomic factors, thereby negatively affecting enterprises' growth rate and profitability (Bloom, 2014). A stable and predictable macroeconomic environment is essential for firms' production and investment and banks' lending decisions. The absence of macroeconomic stability led to high inflation rates and large budget deficits, resulting in a sharp decline in private investment (Mangla & Din, 2015). Similarly, Somoye & Ilo (2009) argue that if banks perceive a stable macro environment more accurately, they will form an expectation that borrowers will be able to pay back and earn good returns on their investment projects. The studies show a relationship between macro uncertainty factors with bank stability. However, studies are evaluated from mean regressions such as FGLS, GMM, while this article draws conclusions based on quantile regression, which considers each small percentile of the dependent variable. Using the quantile regression approach, we analyze in more detail and precisely than the average results. Therefore, it is worth studying whether macroeconomic uncertainty factors lead to unstable banks. The research results will help bank managers in their decisions. First, it can be helpful for commercial banks to have a better

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understanding of macroeconomics and its impact on bank stability to operate prudently, reduce risk, increase income, use cost-effectively, and promote steady operation. Secondly, the research results will be helpful for the State Bank to realize how the impact of macroeconomic policies affects the stability of banks, thereby adjusting macro policies to help the banking system become more stable.

2. Literature review

There is considerable literature supporting the hypothesis that economic uncertainty factors affect the bank performance (Bredin et al., 2009; Bayar & Ceylan, 2017; Dang & Nguyen, 2022), bank lending (Quagliariello, 2009; Whyte, 2010; Ibrahim & Shah, 2012; Yang & Zhou, 2019; Simpasa & Nandelenga, 2022) and only a few foci on assessing the impact of banking instability. However, the theory shows that when a bank's financial performance improves, the bank becomes more stable. NPLs increased, causing more significant losses for banks and hence more instability. Therefore, through financial performance, or bad debt, we can assess the stability of a bank. In addition, empirical studies use the Z-score, calculated as the sum of the bank's return on assets and equity to assets ratio divided by the standard deviation of return on assets, to represent bank stability. Z-score explicitly compares buffers (capitalization and returns) with risk (volatility of returns) to measure the stabilization of the bank, showing that higher values of the Z-score are thus indicative of a low probability of insolvency and greater bank stability. Some studies use the ratio of non-performing loans to represent bank stability; the more extensive the bad debt, the more unstable the bank.

In one of the studies, Bredin et al. (2009) conclude inflation uncertainty in most cases does not harm the output growth performance of an economy that is contrary to their expectations. This evidence implies that macroeconomic uncertainty may even improve macroeconomic performance, i.e. raise output growth and reduce inflation. Whyte (2010) argues that macroeconomic uncertainty does affect bank lending in the short run. Specifically, the volatility of the benchmark interest rate, which is affected by fiscal and monetary policy, was found to be the most critical macroeconomic variable. Therefore, concerns about the sustainability of the current macroeconomic economic environment could partly explain the current weak credit levels. Research by Talavera et al. (2012) for Ukrainian banks indicates that banks increase lending rates when macroeconomic instability decreases. Banks' responses to changes in uncertainty are heterogeneous and depend on individual bank characteristics. It is similarly stated that the effect of macroeconomic conditions on non-performing loans has a different response for each economic sector (Viphindrartin et al., 2021). Topi & Vilmunen (2001) use the conditional variance of consumer or producer inflation or volatility of money supply (M1 and M2) as proxied of macroeconomic uncertainty and investigate the effects of monetary policy on the bank lending channels in Finland. They find that bank lending responds positively to changes in real income and inflation but negatively to monetary policy shocks. Bayar & Ceylan (2017) suggest that macroeconomic uncertainty harms the firm profitability, both return on assets (ROA) and operating profit (ROAF) through firm decision-making. The results show establishing and maintaining a stable macroeconomic environment is of great importance for the profitability of enterprises, thereby achieving sustainable growth and a lower unemployment rate. Valencia (2017) builds a model in which a commercial bank maximizes its benefits. An increase in macroeconomic instability will increase the probability of bank failure. Banks are generally risk-neutral, so credit growth slows down to achieve hedging as uncertainty rises. Empirical studies have shown that all macro uncertainty factors are unlikely to adversely affect financial performance and bank credit. These results give us a prediction of its negative effect on bank stability. In this article, we will test the impact of uncertainty on macro factors such as GDP growth, M2 money supply, and inflation uncertainty on banking stability.

3. Measurement of Macroeconomic Uncertainty

Macroeconomic factors in empirical research represent by proxies such as GDP growth, inflation rate, exchange rate, interest rate, money supply, etc (Viphindrartin et al., 2021). Their uncertainty is measured by variance, standard deviation, or volatility. Talavera et al. (2012), for instance, use the variance of the money supply indicator, the consumer price index, and the volatility of the production price index to represent macroeconomic uncertainty factors. Bayar & Ceylan (2017) study the effect of macroeconomic uncertainty on Return on Assets (ROA) and Return on Operating Profits (ROAF) using exchange rate, interest rate, inflation rate and growth rate volatility proxies to macroeconomic uncertainty. Topi and Vilmunen (2001) use the conditional variance of consumer or producer inflation or volatility of money supply (M1 and M2) as proxied of macroeconomic uncertainty. Adjasi et al. (2008) examined whether the volatility of macroeconomic variables such as exchange rate, money supply, interest rate, inflation rate, and trade deficit affected Ghana Stock Exchange Index returns. In this study, we use macro factors, including GDP growth, inflation rate, and money supply M2, and then

measure their uncertainty using the five-year moving average standard deviation of the past.

4. Measurement of banking stability

In empirical research, bank stability is popularly represented by Z-score. The studies capture bank stability by the natural logarithm of Z-score, where Z-score equals a return on assets (ROA) plus equity-asset ratio (E/A) divided by the standard deviation of ROA (σROA) is quite numerous (Laeven & Levine, 2009; Ozili, 2018; Huang, 2022). In parallel with the ROA component in the Z-score index, the studies replace ROA with ROE as the alternative measures of bank stability (Phan et al. 2022). According to Bourkhis & Nabi (2013), Z-score ratio is an important measure for bank soundness because it is inversely related to the probability of bank's insolvency. Assuming profits are normally distributed, Z-Score measures the probability of a negative return that forces the bank to default, that is, the probability of insolvency of a bank at a given time. A higher Z-Score indicates that the bank has relatively more profits to cover its debt liability and has a lower default risk. Therefore, a higher Z-Score implies a higher degree of solvency, directly measuring bank stability (Bai & Elyasiani, 2013). In addition, Z-score simultaneously considers all three essential aspects in assessing bank performance, including capital adequacy (by the ratio of equity to total assets E/A), profitability (through return on total assets ROA), and risk (by the standard deviation of ROA - volatility of return). The higher the Z-score, the less likely the probability of insolvency is; hence, the bank is more stable and vice versa.

5. Model research

We empirically measure the stability of banking literature using Z-score following the formula below.

$$Z - score = \frac{k + \mu}{\sigma}$$

Where k is equity to total asset ratio (E/A), μ is return on asset ratio (ROA), and is standard deviation of ROA (σROA). The main independent variable is macroeconomic uncertainty we determine GDP growth, money supply M2, and inflation rate volatility by the standard deviation rolling over the previous five years. For the control variable, we follow previous research using bank-specific variables, including bank income growth rate (IGR), funding risk (FUR), ownership concentration (OWC), credit size (TLA), total asset size (SIZ), equity (CAP), loan loss provision (LLP), and loans to deposits ratio (LDR).

We estimate the following regression model:

$$BSI_{it} = \beta_0 + \beta_j M_{it} + \beta_j Z_{it} + \varepsilon_{it}$$

Where BSI is bank stability index as Z-score.

M is vector of macroeconomic uncertainty variables; Z is vector of bank-specific variables.

Table 1. Definition of the Variables

Symbol	Variable Name	Measure	Empirical study
Dependent variables			
BSI	Bank stability	$\log\left(\frac{\text{ROA} + \frac{Equity}{Total\ Asset}}{\sigma(ROA)}\right)$	Laeven & Levine (2009); Beck et al. (2013); Ozili (2018); Goetz (2018); Huang (2022).
Macroeconomic uncertainty variables			
GDPVol	Economic growth uncertainty	The standard deviation of GDP growth	Somoye & Ilo (2009); Yizhong & Song (2014);
INFVol	Inflation uncertainty	The standard deviation of inflation rate	Somoye & Ilo (2009); Talavera et al (2012);
M2Vol	Money supply uncertainty	The standard deviation of money supply	Talavera et al (2012); Viphindrartin et al. (2021)
Bank-specific variables			
Bank-specific variables			
FUR	Funding risk	$\log\left(\frac{\frac{Deposits}{Total\ Asset} + \frac{Equity}{Total\ Asset}}{\sigma\left(\frac{Deposits}{Total\ Asset}\right)}\right)$	Adusei (2015); Ali & Puah (2018).
OWC	Ownership concentration	Largest shareholder rate	Wen & Jia (2010); Agusman et al. (2014).
IGR	Income growth	$\frac{\text{Interest income}_t - \text{Interest income}_{t-1}}{\text{Interest income}_{t-1}}$	Brown & Dinç (2011); Hanafi & Santi (2013); Imbierowicz & Rauch (2014); Adusei (2015); Ghenimi et al. (2017); Dwumfour (2017); Ozili (2018); Huang (2022).
TLA	Loan size	$\frac{\text{Total loans}}{Total\ asset}$	
SIZ	Bank size	Log(Total assets)	
CAP	Equity	$\frac{\text{Equity}}{Total\ asset}$	
LLP	Loans loss provision	$\frac{\text{Loan loss provision}}{Total\ loans}$	
LDR	Loan to deposit	$\frac{\text{Total loan}}{Total\ deposits}$	

6. Research Method

Studies evaluating the impact of macroeconomic uncertainty factors on bank stability use OLS regression if the data used is panel data. If the study uses time series data, the methods used are VEMC and VAR; Our analysis uses panel data from 27 Vietnamese commercial banks from 2012 to 2022. We have balanced panel data with 297 observations. We use the quantile regression method instead of the OLS method because of its advantages over the OLS method. Koenker & Bassett (1982) are the first authors to use the quantile regression method instead of estimating the parameters of the mean regression by the OLS method. Koenker & Bassett (1982) proposed to estimate the regression parameter on each quantile of the dependent variable so that the total absolute difference of the regression function at the quantile η of the dependent variable is minimal. In other words, instead of determining the effect of the independent variable on the mean of the dependent variable, quantile regression will help assess the impact of the independent variable on the dependent variable on each quantile of the dependent variable.

Regression by the OLS method only obtains a single regression line representing the conditional mean of the dependent variable Y according to the values of the independent variable X. Meanwhile, the quantile

regression shows multiple regression functions for each quantile of the dependent variable. Thus, quantile regression has significant advantages over OLS regression. Quantile regression allows the researcher to consider the entire variation of Y_i based on the change of quantile θ€(0,1). On the other hand, according to Hao & Naiman (2007), the quantile regression assumption is not as strict as OLS; for example, the condition of normal distribution and homogeneity of variance is unnecessary. According to Koenker (2005) and Hao & Naiman (2007), quantile regression has the following advantages: quantile regression allows to show in detail the relationship between dependent and independent variables on each quantile of the dependent variable, not just consider this relationship on the mean as OLS regression; In OLS regression, outliers often remove so that the OLS estimate is unbiased. Meanwhile, the quantile regression has robustness, unaffected by such outliers; The parametric tests of quantile regression do not rely on standardization of errors. Furthermore, these tests don't base on any assumptions about the distribution pattern of the regression error; Quantile regression is especially suitable when analyzing regression models with variable variance or in data where the distribution function of the dependent variable is asymmetric around the mean. Then, the quantile regression function on different quantiles will not be the same, showing the various effects of the independent variable on the dependent variable at different quantiles.

7. Research results and discussion.

7.1. Descriptive statistics of research samples

Table 2 describes the statistics of the variables in the research model. We perform detailed statistics for the variable BSI and macroeconomic uncertainty factors to show the minimum and maximum values at the percentiles. For example, the BSI has a mean of 0.0893, a minimum of -0.7734 belonging to the 1% percentile, and a maximum of 0.1172 belonging to the 75% percentile or higher. The variables GDP growth, inflation rate, and M2 supply money uncertainty also exhibit the same values as the bank stability variable.

Table 2: Statistics of variables used in research model

BSI					GDPVol				
	Percentiles	Smallest				Percentiles	Smallest		
1%	0.5034	-0.7734			1%	0.0034	0.0034		
5%	1.0765	0.4148			5%	0.0034	0.0034		
10%	1.2143	0.5034	Obs	297	10%	0.0041	0.0034	Obs	297
25%	1.4613	0.6492	Sum of Wgt.	297	25%	0.0044	0.0034	Sum of Wgt.	297
			Mean	1.7038				Mean	0.0082
50%	1.6918		Std. Dev.	0.4581	50%	0.0056		Std. Dev.	0.0067
		Largest	Min	-0.7734			Largest	Min	0.0034
75%	1.9394	2.9646	Max	4.1213	75%	0.0067	0.0249	Max	0.0249
90%	2.2487	2.9916	Variance	0.2099	90%	0.0192	0.0249	Variance	0.000046
95%	2.4247	3.0062	Skewness	0.2269	95%	0.0249	0.0249	Skewness	1.6869
99%	2.9916	4.1214	Kurtosis	8.0589	99%	0.0249	0.0249	Kurtosis	4.1934
M2Vol					INFVol				
	Percentiles	Smallest				Percentiles	Smallest		
1%	0.0540	0.0540			1%	0.0043	0.0043		
5%	0.0540	0.0540			5%	0.0043	0.0043		
10%	0.0540	0.0540	Obs	297	10%	0.0075	0.0043	Obs	297
25%	0.0626	0.0540	Sum of Wgt.	297	25%	0.0123	0.0043	Sum of Wgt.	297
			Mean	0.0893				Mean	0.0375
50%	0.0968		Std. Dev.	0.0235	50%	0.0218		Std. Dev.	0.0283
		Largest	Min	0.0540			Largest	Min	0.0043
75%	0.1121	0.1172	Max	0.1172	75%	0.0704	0.0757	Max	0.0757
90%	0.1141	0.1172	Variance	0.00055	90%	0.0725	0.0757	Variance	0.00080
95%	0.1171	0.1172	Skewness	-0.3905	95%	0.0757	0.0757	Skewness	0.1949
99%	0.1171	0.1172	Kurtosis	1.5362	99%	0.0757	0.0757	Kurtosis	1.2056

Variable	Obs	Mean	Std. Dev.	Min	Max
IGR	297	0.0921	0.2355	-1.5658	0.9359
FUR	297	1.2875	0.3783	0.3984	2.5868
OWC	297	0.6651	0.1496	0.3488	0.9745
TLA	297	0.5635	0.1309	0.1096	1.0100
SIZ	297	8.0631	0.4993	7.1214	9.2459
LLP	297	0.0135	0.0058	0.0066	0.0773
CAP	297	0.0919	0.0380	0.0406	0.2383
LDR	297	0.8785	0.1933	0.1536	1.8050

7.2. Unit Root test

All variables in research model must be stationary before panel data can be analyzed; the study uses the ADF fisher test, which will remove cross-sectional means by using demean. Table 3 presents the results of the panel unit root test of each variable in the model. Table 3 shows that all four tests strongly reject the null hypothesis that all the panels contain unit roots. The simulation results of Choi (2001) suggest that the inverse normal Z statistic offers the best trade-off between size and power and recommends using it in applications. The study has observed that the inverse logit L∗ test typically agrees with the Z test. Under the null hypothesis, Z has a standard normal distribution, and L∗ has a t distribution with 5N + 4 (139) degrees of freedom. Low values of Z and L∗ cast doubt on the null hypothesis (xtunitroot test - Stata.com).

Table 3: Panel Unit Root Test Result

Ho: All panels contain unit roots Ha: At least one panel is stationary							
		ADF regressions: 0 lags					
		BSI	INFVol	M2Vol	IGR	FUR	OWC
Inverse chi-squared(54)	P	184.1303 ***	92.3254***	201.4696***	299.2618***	185.3220***	173.4948***
Inverse normal	Z	-9.3028 ***	-4.7383***	-10.2774***	-13.6480***	-9.3075***	-8.1117***
Inverse logit t(139)	L*	-9.6446 ***	-4.3421***	-10.6575***	-15.9106***	-9.6890***	-8.8794***
Modified inv. chi-squared	Pm	12.5218 ***	3.6879***	14.1903***	23.6003***	12.6365***	11.4984***
		ADF regressions: 0lags					ADF regressions: 1 lags

		TLA	SIZ	LLP	CAP	LDR	GDPVol
Inverse chi-squared(54)	P	192.2597***	80.3867**	189.3348***	161.9713***	199.3125***	149.6732***
Inverse normal	Z	-8.9952***	- 1.8069**	-8.8613***	-7.7058***	-8.3634***	-7.9692***
Inverse logit t(139)	L*	-9.9480***	-1.8618***	-9.7615***	-8.1094***	-9.9277***	-7.7836***
Modified inv. chi-squared	Pm	13.3040***	2.5391***	13.0226***	10.3895***	13.9827***	9.2062***
Note: *, **, *** represents 10%, 5%, and 1% significance level.							

7.3. Variable correlation matrix

Table 4 presents the pairwise correlation between the variables in the model. Accordingly, the pairwise correlation between GDP growth volatility and banking stability (BSI), between inflation volatility and BSI, is negative and statistically significant at 1%. The pairwise correlation between money supply M2 uncertainty and BSI is also negative but statistically insignificant.

Table 4: Variable correlation matrix

	BSI	GDPVol	M2Vol	INFVol	FUR	OWC	IGR	TLA	SIZ	LLP	CAP	LDR
BSI	1											
GDPVol	-0.1506***	1										
M2Vol	-0.0891	0.1035*	1									
INFVol	-0.2870***	-0.4784***	-0.1998***	1								
FUR	0.1923***	0.1455**	-0.2100***	-0.3834***	1							
OWC	0.0414	-0.0223	0.0153	0.0038	0.0019	1						
IGR	0.0077	0.0214	-0.0842	-0.1090*	0.0194	0.0438	1					
TLA	0.1376**	0.1959***	0.0094	-0.4121***	0.3933***	-0.0253	-0.0515	1				
SIZ	0.1036*	0.2430***	0.0052	-0.3634***	0.2965***	-0.1262**	0.085	0.3475***	1			
LLP	-0.1064*	0.0005	0.1469**	0.0993*	-0.053	0.0144	-0.1553***	-0.2517***	0.1986***	1		
CAP	-0.1055*	-0.0924	0.0439	0.3180***	-0.1306**	0.1522***	-0.1962***	-0.0762	-0.5825***	-0.059	1	
LDR	0.0277	0.1809**	0.1172**	-0.2004***	0.0979*	0.078	0.1663***	0.6084***	0.1440**	-0.2471***	0.1500***	1
*Note: *, **, *** represents 10%, 5%, and 1% significance level.*												

7.4. Discussing research results

OLS regression results in the impact of instability of macro factors on bank stability by a single mean regression function. But with quantile regression, the bank stability level is divided into many small quantiles, and for each quantile, there is a regression function. Taking this advantage, the quantile regression results of Table 5 show that at low quantiles of the BSI variable (Q10, Q20, Q30, Q40, and Q50), the uncertainty of GDP growth has a negative effect on bank stability. This result shows that the more tense the economic growth is, the more unstable the bank will be if banks have low stabilization. However, if banks have high stability, economic growth uncertainty does not affect banking stability. The proof is that the GDPVol variable's regression coefficient is statistically insignificant in the high quantiles of BSI variable (Q60, Q70, Q80, and Q90). Like economic growth uncertainty, integrated money supply uncertainty increases banking stability at the Q10, Q20, Q30, Q40, Q50, Q60, and Q70 quantiles of BSI variable. Money supply uncertainty does not affect bank stabilization for banks with excellent high stability (Q80 and Q90 quantiles of BSI variable). Estimating the effects of GDP growth and money supply uncertainty suggests that when banks have significantly positive returns, high equity, and slightly volatile returns, economic growth, and money supply volatility do not affect bank stabilization because the bank can perform its functions well in unstable macroeconomic conditions. The results show the meaning of the statement on the State Bank of Korea website: "Stability of financial institutions refers to a condition in which individual financial institutions are sound enough to carry out their financial intermediation function adequately, without assistance from external institutions including the government."

Table 5: Estimation results of the impacts of macroeconomic uncertainty factors on bank stability

BSI	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
GDPVol	**-9.176*** **	**-9.349** **	**-10.09** **	**-9.065** **	**-9.969** **	-6.398	-3.567	-1.619	-2.076
	[-2.68]	[-2.12]	[-2.39]	[-2.55]	[-2.54]	[-1.49]	[-0.56]	[-0.29]	[-0.29]
M2Vol	**-3.364** **	**-2.737** **	**-2.547** **	**-2.077** **	**-1.967***	**-2.664** **	**-2.749** **	-1.907	-1.989
	[-2.13]	[-2.32]	[-2.47]	[-2.40]	[-1.66]	[-1.98]	[-2.10]	[-0.99]	[-0.90]
INFVol	-1.931	**-2.193***	**-1.932** **	**-1.411** **	**-1.654***	**-2.908*** **	**-4.158*** **	**-5.815*** **	**-6.424*** **
	[-0.85]	[-1.76]	[-2.02]	[-2.02]	[-1.74]	[-2.95]	[-2.98]	[-2.76]	[-3.68]
IGR	-0.0501	0.0285	0.131	-0.0526	0.00197	0.0508	-0.133	-0.0972	-0.0775
	[-0.43]	[0.21]	[0.98]	[-0.39]	[0.01]	[0.36]	[-0.96]	[-0.48]	[-0.38]
FUR	0.11	0.123	0.158**	0.104	0.113	0.0974	0.0262	0.0714	0.09
	[0.84]	[1.29]	[2.00]	[1.14]	[1.08]	[0.72]	[0.20]	[0.61]	[0.49]
OWC	0.307	0.228	0.183	0.177	0.209	0.0979	0.11	0.0633	-0.0658
	[1.20]	[1.55]	[0.95]	[1.03]	[1.07]	[0.57]	[0.37]	[0.20]	[-0.16]
TLA	0.577	0.587	0.465	0.116	-0.00108	-0.0722	-0.586	-1.112***	-1.550*
	[0.93]	[1.47]	[1.10]	[0.30]	[-0.00]	[-0.18]	[-1.38]	[-2.80]	[-1.94]
SIZ	0.0287	0.0174	-0.0137	-0.00069	-0.0637	-0.0895	-0.0494	0.106	0.13
	[0.32]	[0.19]	[-0.14]	[-0.01]	[-0.62]	[-1.07]	[-0.45]	[0.69]	[1.02]
LLP	7.941	6.002	5.112	1.734	-0.728	-2.81	-2.206	-14.16	-23.16**
	[1.03]	[1.10]	[1.39]	[0.41]	[-0.20]	[-0.90]	[-0.41]	[-1.50]	[-2.20]
CAP	-1.342	0.527	1.025	0.431	-0.49	-0.705	-0.468	0.0902	-0.777
	[-0.96]	[0.44]	[0.79]	[0.38]	[-0.36]	[-0.52]	[-0.33]	[0.06]	[-0.52]
LDR	-0.108	-0.13	-0.0279	0.0563	0.0495	0.0792	0.156	0.22	0.103
	[-0.29]	[-0.42]	[-0.10]	[0.25]	[0.26]	[0.25]	[0.55]	[1.29]	[0.26]
_cons	0.748	0.844	1.077	1.330**	2.065**	2.644***	2.806***	2.070*	2.716***
	[0.84]	[1.23]	[1.44]	[2.25]	[2.35]	[3.57]	[3.39]	[1.68]	[2.98]
N	297	297	297	297	297	297	297	297	297
Pseudo R2	0.2470	0.2678	0.2723	0.2711	0.2702	0.2635	0.2591	0.2660	0.2501
*Standard errors in brackets: * p<0.1, ** p<0.05, *** p<0.01*									

The regression coefficient of inflation uncertainty is an adverse effect and statistically significant at most quantiles of BSI variable, except for the Q10 quantile of BSI variable. Increased inflation uncertainty makes the bank more volatile. As argued by Hatzinikolaou et al. (2002), Caglayan et al. (2015), inflation uncertainty can affect the performance of companies, especially in terms of income and tax structure. For example, the volatility of companies' sales and expenses increases in an uncertain macroeconomic environment, posing the challenge of earnings volatility. On the

other hand, economic efficiency decreases in the presence of inflationary fluctuations because relative price fluctuations lose the advantage of information transmission. Therefore, as the economy has uncertain inflation, bank profits are likely to decrease, bad debt increases, and banking stability weakens. The inflation uncertainty coefficient is statistically insignificant at the Q10 quantile of BSI variable. This result implies that for a bank with a deficient level of stability, inflation volatility has no significance on this stability. Bank instability can be influenced mainly by specific factors.

8. Conclusion and recommendation

With balanced data from 27 Vietnamese commercial banks for 2012-2022 and taking advantage of quantile regression, this paper has obtained exciting results on the impact of uncertain macro factors such as GDP growth, money supply M2, and inflation rate on bank stability. For banks with low stability, GDP growth further reduces stable of the bank. However, for banks with high stability, GDP growth uncertainty has an insignificant impact on their stabilization. Money supply uncertainty affects banking stability with similar results to GDP growth uncertainty. Inflationary uncertainty negatively affects the bank's stability in almost all levels of stabilization, except for banks with deficient levels of stability where inflation uncertainty is not an influencing factor.

The research results suggest solutions for bank managers to enhance financial efficiency and increase stability. Once bank stability is high, the negative impact of GDP growth and M2 money supply volatility will not be a concern. The macro policy management agency needs to control the money supply (M2) for the economy as planned. The State Bank must flexibly use monetary policy management tools to control the money supply to the economy, such as credit lines, open market operations, refinancing interest rates, exchange rates, and reserve requirements. In particular, the State Bank should prioritize the open market operation tool because it can promote the direct effect and quickly reverse the liquidity of the banking system and the money supply in the economy. Stabilizing the money supply helps to stabilize inflation. At the same time, fiscal policy coordinate with monetary policy in stabilizing the value of money to stabilize inflation. Government spending on public investment needs to be coordinated and planned in line with the State Bank's monetary policy direction. Unstable economic growth harms the stability of the banking system. To stabilize economic growth, the government must implement policies encouraging enterprises to diversify export markets and institutional reforms to attract more large investment groups abroad. The corporate bond and stock markets should also be encouraged to help businesses diversify long-term funding and avoid relying too much on the banking system, thereby reducing systemic risks for banks and increasing stabilization of banks.

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ASSESSING THE IMPACT OF FACTORS ON VIETNAM'S KEY SEAFOOD PRODUCT EXPORTS: A CASE STUDY OF THE EUROPEAN UNION MARKET

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Abstract: ***This paper aimed to determine the impact of factors on Vietnam's key seafood product exports to the European Union. A gravity model was employed to analyze the panel data of 27 EU member nations in the partnership with Vietnam during the period of ten years from 2011 to 2020. After study, the findings showed that the key seafood exports of Vietnam to its European partner countries are determined by GDP, the GDP per capita between Vietnam and EU countries, the population of EU countries, the distance, and the real effective exchange rates. Of which, the GDP per capita is the factor with the strongest impact, followed by the GDP of the member countries. The remaining factors also have an impact but with low coefficients (the highest is only 0.86). Based on the obtained results, the article has made two suggestions to further promote the export of these products to the EU market: Dominating and stabilizing a domestic market; Enhancing product quality to make Vietnamese seafood become a common to high-end product in the EU market to take advantage of the free trade agreement between Vietnam and the EU that has just taken effect.***

• Keywords: *EU, Gravity model, key seafood, seafood exports, Vietnam.*

JEL codes: D29, F14, F23, F62

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1. Literature review

The gravity model has long been regarded as the bedrock of international commerce. The concept was initially offered as a simple parallel between Newton's Law of Gravity and the variables influencing bilateral trade flows. The volume of commerce between countries i and j is thought to be directly related to economic size and inversely proportional to geographical distance (Timbergen, 1962).

$$T_{ij} = \propto \frac{Y_j Y_i}{D_{ij}}$$

In which,

T_{ij}: Trade turnover between two countries i and j

Y_i: The magnitude of the country's economy i

Y_j: The magnitude of the country's economy j

D_{ij}: Geographical distance between country i and j

Despite its practical effectiveness, the gravity model needed a theoretical underpinning. Linneman (1966) is said to be the first to establish a theoretical framework for the gravity model, demonstrating that the gravity model may be derived from the partial equilibrium model. Factors that demonstrate nation i's entire potential supply, country j's potential aggregate demand, and factors that obstruct the flow of commerce between countries explain trade flows between countries i and j. After that, the gravity model is obtained by balancing supply and demand. Subsequently, numerous scholars expanded on Linerman's concept and gave the comprehensive models that are now widely used.

The existing literature on the application of the gravity model to services trade is so far quite limited. Ngan Thi Pham, Tu Thanh Nguyen, and Phung Phi Tran Thi (2016) utilized a gravity model to identify and assess the effect of factors influencing Vietnamese seafood export turnover to the European and North American market. The data of 26 nations was collected from 2006 through 2015. After study, authors showed Vietnamese seafood exports to various markets were impacted by GDP of importing and exporting nations, population, and currency rates. The exchange rate is connected to exports, although geographical distance has the opposite impact. Otherwise, these nations' seafood import taxes will have little effect on Vietnam's seafood exports to the US and Europe.

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Mai Thi Cam Tu (2016) developed a gravity model that uses data from 2005 to 2014 to provide an overview of the present state of Vietnam-Japan seafood exports. The acquired findings revealed that the amount of seafood, investment capital in transportation and information storage, and per capita income have a positive effect (+) on the value of Vietnam-Japan seafood exports while the influence of seafood pricing, trade partnership agreements, and rates on that is negative. Nguyen Binh Duong (2014) and Vu Thanh Huong (2018) utilized the gravity model's estimated findings to calculate the elasticity coefficient, which represents the change in trade flows when tariffs are altered, and then anticipate the change in trade flows.

Huy Quang Nguyen, Huong Thi Lan Tran, Hoan Quang Truong, and Chung Van Dong (2020) used a gravity model to investigate the drivers of Vietnam's global seafood exports from 2000 to 2018 at the aggregate and specific levels of the fisheries industry. According to the estimation, the size of the Vietnamese economy and the economic levels of its importing partners affect Vietnam's seafood exports. The Association of Southeast Asian Nations, the European Union, and North America are stated to boost Vietnam's seafood exports on a global scale. At the sub-sector level, North America has a positive influence on Vietnam's seafood exports (fresh, chilled, or frozen), while having a cross-regional negative impact on crustacean exports, molluscs and aquatic invertebrates, and aquatic fish and invertebrates (prepared or preserved).

2. Methodology

2.1. Estimation model and research hypothesis

The study used the Vu Thanh Huong breed model (2018) to quantify the impact of factors influencing the growth scale of seafood exports to member nations. However, the study's model has been modified. In addition to upgrading the research data and increasing the sample size, the exchange rate variable is included in the study to examine the influence of the exchange rate on the export turnover of important seafood products in Vietnam. The following is the exact model:

$$\ln Exjit = \beta_0 + \beta_1 \ln GDP_{jt} + \beta_2 \ln GDP_{it} + \beta_3 \ln PGDP_{jt} + \beta_4 \ln D_{ji} + \beta_5 \ln R_{jit} + \beta_6 \ln TAR_{jit}$$

Where:

Ln: Hyperbolic logarithm

j: Trade partner countries

i: Vietnam

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$: Include individual regression coefficients of each factor in the model

Table 2: Variables and expected signs in the model

Variable	Variable explanation	Unit	Expectation sign	Author
GDP_{ji}	Gross domestic product of country (area) j and Vietnam	USD	+	Ekrem Erdem and Saban Nazlioglu (2014) Mohamed A. Elshehawy, Hongfang Shen, Rania A. Ahmed (2014) Vu Bach Diep, Nguyen Thi Phuong Thao, Ngo Hoai Thu (2018).
$PGDP_j$	Per capita income of the country (region)	USD	+	Paulo Camacho (2013) Nguyen Ngoc Quynh, Pham Hoang Linh, (2018).
D_{ji}	Distance between Vietnam and country (area) j	Kilometers	-	(Timbergen, 1962), M.Ebaidalla A.Abdalla (2015) Sotja G. Dlamini, Abdi-Khalil Edriss, Alexander R. Phiri, Micah B. Masuku (2016)
R_{ji}	Exchange rate (VND/EUR)	VND/EUR	+	Lanuza Díaz et al (2013) Huy Quynh Nguyen (2014) Luong Anh Thu, Sun Fang và Sham Sunder Kessani (2019)
TAR_{ji}	Average import tax of country (area) j on goods of Vietnam.	%	-	Murat Genç và David Law (2014) Vũ Thanh Hương (2018) Nguyen Thi Thu Thuong, Doan Thi Hong Thinh, Nguyen Tien Long, và Dinh Hong Linh (2021)

Source: Author's personal collection

2.2. Data

2.2.1. Selection of seafood products

The study uses the HS classification of the World Customs Organization to identify the main aquatic products of Vietnam. Under the HS system, aquatic products fall into two groups: HS03 (Fresh, chilled, and frozen products, fillets, whole) and HS16 (Processed or preserved aquatic products).

Table 3: Vietnam's major exported seafood products

No.	Types	Product Description	HS code
1	Pangasius	Fresh, chilled, and frozen, fillets, whole	030272, 030324, 030432, 030429, 030462
2	Tuna	Processing or preserving	160414
		Fresh, chilled, and frozen	030194, 030195, 030231, 030232, 030233, 030234, 030235, 030236, 030239, 030341, 030342, 030343, 030344, 030345, 030346, 030349, 030487
3	Shrimp	Processing or preserving	160520, 160521, 160529, 160530
		Fresh, chilled, and frozen	030611, 030612, 030613, 030615, 030616, 030617, 030619, 030621, 030622, 030625,030626, 030627, 030629, 030631
4	Molluscs	Processing or preserving	160551, 160552, 160553, 160554, 160555, 160556, 160557, 160558, 160559
		Fresh, chilled, and frozen	030721, 030722, 030729, 030771, 030772, 030779, 030741, 030742, 030743, 030749, 030751, 030752, 030759, 030791, 030792, 030799

Source: General Department of Customs.

2.2.2. Metrics for gravity model

The empirical study is evaluated using panel data from Vietnam and the European Union from 2011 to 2020. All of the numbers are taken from reliable sources, specifically:

- Data on seafood export turnover in USD are obtained from the United Nations trade statistics database (Comtrade), and the International Trade Center (ITC).

- The French Center for Prospects and International Information provides data on geographical distances in kilometers between nations (CEPII).

- Data on country import tax rates are derived from the WITS database and the WTO Centre.

- Exchange rate data is obtained from the International Monetary Fund (IMF).

Estimation methods for panel data can be of three types: pooled ordinary least squares (Pooled OLS), fixed effects models (FEM), and random effects models (REM). Each model has its own set of benefits and drawbacks. The Pool model is appropriate if each entity has no specific features since it offers a straightforward approach, providing the coefficients do not vary over time and cross units. For FEM models, the regression model may isolate the impacts of the independent effects that do not vary over time from the independent variables, allowing the true effects of the independent variables on the dependent variable to be estimated more correctly. However, FEM cannot estimate variables that do not change over time. Meanwhile, REM will be chosen if the entity's individual attributes are random and unrelated to the independent factors. The residuals of each entity will be considered as a new explanatory variable in REM, and they will be used to measure agents that do not change over time. As a result, the research will rely on the features of the model's data series to pick the right model.

3. Findings

The study employed the Breusch-Pagan test to pick between Pooled OLS and REM to estimate the model based on the features of the data series. The results of the tests suggest that the Random Effects model is appropriate (Appendix 8).

The Hausman test is then used to assess the fit between FEM and REM. The test findings indicate that the Random Effects model should be used. Based on the data, we may infer that Prob>chi^2 = 0.5514 > = 0.05, implying that the model used in the study is the REM model. (See Appendix 7.)

This study used the Generalized Least Square (GLS) approach to address the aforesaid faults of variable random variance and autocorrelation, and the estimated results are provided in the table 4.

With P (T-statistics) 0.05 GDPj, GDPi represents the EU and Vietnam's economic size, $PGDP_j$ represents the EU member nations' economic development level, and D_{ji} indicates geographical distance. The exchange rate R_{ji} is statistically significant with this model at 0.1 level. However, the signs of these variables diverge, with Dji having a positive value, and GDPi and $PGDP_j$ having a negative sign, which differs with the model's expectations.

Table 4: Regression results have corrected the model's defects for the EU market

Variable	Coefficient	Standard deviation	t-Statistic	Prob
C	4.264648	6.816957	0.63	0.532
GDP_j	1.659919***	0.337538	49.18	0.000
GDP_i	-0.8654729***	0.2163527	-21.59	0.000
$PGDP_j$	-2.303571***	0.1067143	-21.59	0.000
D_{ji}	0.8319328***	0.1207101	6.89	0.000
R_{ji}	0.6093129*	0.3542107	1.72	0.085
TAR_{ji}	0.4255059	2.567962	0.17	0.868

*Note: ***, **, *: statistically significant for α = 1%, 5% and 10% respectively*

Source: Calculated by authors

According to the suggested hypothesis, the variable GDP_j has a positive sign, whereas the variable $PGDP_j$ has a negative sign and is statistically significant at 1%. This illustrates a negative impact of EU GDP and GDP per capita on Vietnam's seafood exports. It may be stated that when the GDP of the partner nations rises, so does the economy, increasing demand for Vietnam's major seafood goods (the GDP of EU countries rose by 1%, while exports of four important seafood items rose by 1.66%). However, as affluence rises, so does the demand for certain fish items. This is comprehensible given that the majority of 4 seafood goods exported from Vietnam to EU nations are in the medium and low-end categories, and when income rises, buyers prefer to shift to more high-end products that are suited for consumers. In microeconomics, consumption law (When income climbed by 1%, important seafood exports declined by 2.3%).

With a confidence level of 1%, the variable GDP_i = - 0.865 is statistically significant. The variable GDPi, which represents the size of the Vietnamese economy, has a negative sign, which is inconsistent with the suggested model theory. For the distance variable D_{jv} = 0.832, there is statistical significance with 1% confidence, however, this variable has a positive sign that is not consistent with the proposed economic theory and has a negligible impact. This means that distance is not a hindrance to Vietnam's exports of four key products to the EU. The reason for this is that the import of key EU seafood products from Vietnam depends on consumer tastes more than distance. This can also be explained by the fact that the EU is an alliance of countries whose geographical distances are not too big.

The coefficient of the variable Rji = 0.609 has statistical significance with the 10% confidence level and has a positive sign that is consistent with the proposed trade theories. According to the estimated results, for every 1% increase, seafood exports increase by 0.609%. When this exchange rate increases, it can be about the export price of fish as the real exchange rate increases (ie, the VND depreciates and the EURO appreciates), in the EU market, the price of seafood imports from Vietnam. The currency in EUR will now be lower than before, EU consumers will tend to import seafood from the Vietnamese market more. In the Vietnamese market, the export price in VND has increased more than before and businesses tend to export more fish to the EU. Besides, when the exchange rate increases, the input costs for export production activities will also increase for Vietnamese enterprises (in VND), making seafood export prices higher. Therefore, when the exchange rate increases, the export volume of Vietnam's key seafood products to the EU market increases.

Conversely, the variable TARj in the EU market gravity model is not statistically significant. This indicates that there is insufficient information to infer that tariffs harm Vietnam's export of vital seafood goods. The reason for this is that the quality of Vietnam's principal export seafood goods has been improved.

4. Conclusion

Seafood is a crucial export commodity that contributes a significant amount of foreign money to Vietnam's economic growth and development. From 2011 to 2020, the European Union market was one of Vietnam's top importers of pangasius, tuna, shrimp, and molluscs. Vietnam has recently faced a number of obstacles, including competing with other countries, expanding growth, constraining capital, and so on. Based on the gravity model in international commerce, the research investigates the variables influencing Vietnam's export of important seafood items, including GDP, PGDP, distance, exchange rate. After studying, the results showed that among the influencing factors, GDP per capita of EU member countries has the largest and most negative impact on the export of Vietnam's key seafood products to the EU market with an impact coefficient of up to 2.3. This means that Vietnam's seafood products in the EU market seem to be only a secondary product because it receives a very strong negative reaction when the income of people here increases. The second largest influencing factor is the GDP of EU member countries. When the GDP of EU member countries goes up by 1%, the demand for imported seafood will increase with a coefficient of 1.66%. In addition to the two factors mentioned above, Vietnam's GDP and geographical distance also have an impact in many different directions but with the coefficient is not too large, only about 0.8. Obviously, in the Vietnamese market, seafood products are still considered luxury goods, so an increase in GDP leads to a rise of domestic demand for seafood, thereby reducing the amount of seafood exports. The exchange rate factor also has an influence with a coefficient of 0.6. Thus, when VND depreciates compared to the Euro, it will be a good opportunity for exports because this product will become relatively cheaper.

Thus, it can be seen that the research has explored valuable findings and has given relevant stakeholders from farmers, fishermen, export businesses and the Vietnamese government important suggestions. Firstly, it is necessary to have policies and solutions to prioritize dominating the domestic market in the context that the trend of Vietnam's economy has been growing quite stably. Secondly, the quality of products needs to be enhanced by applying more deeply EU standards from fishing, farming, preservation, and processing to turn seafood products from secondary products into normal goods. Thereby, Vietnam's seafood exports can take advantage of economic development in the region as well as the incentives of FTA agreements.

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EXPERIENCE IN ATTRACTING GREEN FDI IN SOME ASIAN COUNTRIES AND IMPLICATIONS FOR VIETNAM

MA. Mai Tuyet Nhung*

Abstract: ***Green foreign direct investment (FDI) is when foreign investors inject clean technologies, practices, projects, and capital into a host country. This type of investment aims to support development and tackle issues like pollution, climate change, and resource depletion. In Vietnam, in recent years, it has been evident that alongside the positive contributions and the demand for "greening" FDI, there are still many FDI projects that have negative impacts on the environment. In this context, green FDI is an inevitable investment trend. The paper discusses the experiences of some Asian countries in attracting green FDI, thereby providing some implications for Vietnam.***

• Keywords: *green foreign direct investment, FDI projects, capital, climate change.*

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1. Introduction

Currently, facing environmental pollution, recipient countries are increasingly focusing on strengthening environmental protection policies. When a country receives clean FDI investment projects, it will have the opportunity to receive modern environmentally friendly processing technologies, both increasing economic benefits and ensuring the environment.

In Vietnam, since the Government announced its commitment to achieving net-zero emissions by 2050, there have been many new high-quality FDI projects that focus on sustainable investment choosing Vietnam as their destination, creating a new wave of investment that is transforming the economy. Along with the strong determination from the government, ministries, sectors, and localities towards a green economy, Vietnam has a clear opportunity to attract FDI, especially for high-tech investment projects with minimal environmental impact from developed countries.

In recent years, it has been evident that alongside the positive contributions and the demand for "greening" FDI, there are still many FDI projects that have negative impacts on the environment. In this context, green FDI is an inevitable investment trend.

In fact, in addition to the characteristics of Vietnam's large market size and potential, investors from developed countries are increasingly interested in environmental and sustainability issues in the process of making investment decisions. The flow of FDI into Vietnam has seen many projects aimed at developing green technology and clean technology of the future. This also reflects Vietnam's direction for foreign investment cooperation in the new phase. As a result, the concept of green FDI is now becoming popular in Vietnam. In this paper, the author discusses the experiences of some Asian countries in attracting green FDI, thereby providing some implications for Vietnam.

2. Overview of Green FDI

2.1. Concept of Green FDI

Currently, there are quite a few different perspectives on green FDI. The United Nations Conference on Trade and Development (UNCTAD, 2008) refers to green FDI as comprising two types of investment: (i) FDI that complies with national environmental standards; (ii) investment in the direct production of environmental products and services in the host country. In agreement with this view, Stephen Golub and colleagues (2011) categorize FDI into two directions: i) investment in products and services, and ii) investment in production processes.

According to UNCTAD (2008) and OECD (2010b), green FDI is characterized by its significant contribution to improving environmental performance, often through

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advanced technologies that surpass conventional industry standards. Green FDI includes: (i) FDI in the field of environmental goods and services and (ii) FDI in processes that mitigate environmental damage, such as the use of cleaner technologies or more energy-efficient practices. This approach not only promotes economic growth but also plays a crucial role in environmental protection.

UNCTAD (2010) continues to present its views on green FDI, emphasizing low-carbon FDI as an important aspect of green FDI. It defines it as the transfer of technology, practices, or products from multinational companies to host countries through forms of FDI that can be either fair or unfair. In other words, when discussing green FDI, UNCTAD highlights two factors: (i) low-carbon products and services and (ii) low-carbon processes.

According to Johnson Lise (2017), green FDI is when foreign investors inject clean technologies, practices, projects, and capital into a host country. This type of investment aims to support development and tackle issues like pollution, climate change, and resource depletion. By adopting sustainable technologies and practices, foreign investors can enhance performance and assist in moving to a less-carbon market. Green FDI can include investing in energy projects, energy-efficient infrastructure, waste management systems, and sustainable agriculture practice.

Thus, it can be understood that green FDI refers to FDI in the production of environmental products and services, or FDI that employs production processes that minimize environmental pollution, with the aim of both economic development and the rational use of resources, while avoiding environmental destruction, climate change, and ecological imbalance in the host country.

2.2. Classification of Green FDI

Green FDI can be divided into two types of investment: clean FDI and low-carbon FDI (low-carbon FDI - LCF), in which:

- Low-carbon FDI refers to the transfer of technology, expertise, or products from transnational corporations (TNCs) to the host country through FDI, which helps reduce greenhouse gas (GHG) emissions.

- Clean FDI is understood as a type of direct investment that must be directed towards the sustainable growth of the economy, primarily meeting the requirements for environmental protection as well as economic and social benefits.

2.3. Key benefits of Green FDI

Green FDI brings benefits like promoting sustainable development by introducing clean technologies, practices, and projects, leading to reduced environmental impact, job creation in green sectors, economic growth, and access to advanced technologies... According to the research of Florence Jaumotte Jaden Kim Samuel Pienknagura Gregor Schwerhoff (2024), there are many key benefits of green FDI as follows in Table 1.

Table 1: Key benefits of Green FDI

Benefits	Meanings
Environmental benefits	Reducing greenhouse gas emissions, promotes cleaner production processes, and helps conserve natural resources.
Economic benefits	Creating new jobs in green industries, boosts economic growth through technology transfer, and attracts further investment in sustainable sectors
Social benefits	Improving living standards by enhancing access to clean energy and sustainable infrastructure.
Social benefits	Improving living standards by enhancing access to clean energy and sustainable infrastructure.
Innovation driver	Encouraging the development and adoption of new green technologies and practices
Development potential for emerging economies	Allowing developing countries to leapfrog traditional polluting technologies and access advanced sustainable solutions.

Source: Florence Jaumotte Jaden Kim Samuel Pienknagura Gregor Schwerhoff (2024)

3. Experiences of some countries in attracting green FDI

3.1. Experiences of China

Since the initiation of economic reforms and opening up, China has experienced a continuous increase in the scale of FDI. According to the China Foreign Investment Development Report (2022), China's actual utilization of FDI has risen from $111.716 billion in 2012 to $173.48 billion in 2021, marking an impressive growth rate of over 55%. China consistently maintains its position as the second-largest recipient of FDI globally. In 2024, despite the global economic slow recovery and rising uncertainties, China's ability to maintain the growth of newly established foreign-invested enterprises highlights its continued attractiveness to foreign investors. The data also reflects the ongoing optimization of China's foreign investment structure, with high-tech industries and professional services increasingly drawing foreign capital, indicating a shift toward more advanced and specialized sectors.

In 2024, the number of newly established foreign-invested enterprises in the country reached 59,080, marking a 9.9 percent increase compared to the previous year. However, the actual utilization of FDI declined by 27.1 percent, totaling RMB 826.25 billion (USD 115.56 billion). Sector-wise, the manufacturing industry saw a substantial portion of the FDI, with RMB 221.21 billion (US$30.85 billion) in actual foreign investment, while the service sector attracted a larger share, receiving RMB 584.56 billion (USD 81.47 billion). Among the high-tech sectors, high-tech manufacturing stood out with RMB 96.29 billion (USD 13.42 billion) in FDI, accounting for 11.7 percent of the total foreign investment in China. Notably, certain high-tech industries saw impressive growth in foreign investment, including the medical instruments and equipment manufacturing industry, which grew by 98.7 percent, the professional technical services sector, which saw a 40.8 percent increase, and the computer and office equipment manufacturing industry, which grew by 21.9 percent.

Over the years, China has been making efforts to attract green FDI associated with environmental protection and sustainable development. For example, in 2024, China's legislature has released a new plan to attract foreign investment after a year of falling FDI inflows. The Plan, the latest in a series of efforts to boost foreign capital in China, proposes measures to improve the business environment, ease administrative burdens, expand market access in key industries, and even the playing field for foreign companies. According to the Action Plan, one of measures is the expansion of the national catalogue that will focus on increasing support for areas such as advanced manufacturing, high-tech, energy conservation, and environmental protection. The Action Plan also calls for increasing financial support for foreign-invested enterprises (FIEs), with financial institutions encouraged to provide high-quality financial services and financing support to qualified FIEs. Qualified FIEs will also be supported to issue RMB bonds domestically for financing and use for domestic investment projects.

3.2. Experiences of Singapore

Singapore is the leading destination for FDI in Asia, particularly in high-tech and sustainable industries. The number of greenfield investment projects in Singapore has also increased significantly, from 307 projects in 2020 to 410 projects in 2022, with the investment value rising from USD 6.869 billion to USD 16.228 billion during the same period (UNCTAD, 2023). Singapore has developed a comprehensive policy framework to attract green FDI, focusing on strong policy support, strategic incentives, and significant infrastructure investment. This nation's approach includes a diverse strategy aimed not only at direct economic benefits but also aligned with long-term sustainable goals. For example, the Green Plan 2030 sets ambitious targets to reduce carbon emissions, increase electric vehicle usage, and enhance green spaces throughout the city (National Resources and Environment Ministry, 2021). This plan provides clear guidance for businesses and investors regarding the Singapore government's commitment to sustainability.

Additionally, to specifically attract green FDI, Singapore offers a range of incentives including tax rebates, subsidies for technological innovation, and financial support for sustainable projects. The EDB manages various programmes such as the Energy Efficiency Investment Grant to provide tax deductions on capital expenditure for projects that achieve significant energy efficiency improvements (EDB, 2023). Singapore has invested heavily in modern infrastructure to support green technologies, including developing eco-industrial parks and improving public transport systems to reduce its carbon footprint. This infrastructure not only supports sustainable practices but also enhances business efficiency.

The Singapore's significant progress in renewable energy, highlighted by the completion of one of the world's largest floating solar power systems and a significant increase in solar capacity, has positioned this nation as a pioneer in sustainable urban development. These efforts not only underscore Singapore's commitment to achieving its solar energy targets but also enhance its attractiveness as a destination for green FDI.

4. Current status of attracting green FDI capital in Vietnam

By the end of 2024, the total newly registered, adjusted and contributed capital for shares and capital contributions by foreign investors into

Vietnam reached nearly USD 38.23 billion, down 3% over the same period in 2023. Specifically, there were 3,375 new investment projects (up 1.8% over 2023), the total registered capital reached more than USD 19.7 billion (down 7.6% over 2023); there were 1,539 projects registered to adjust investment capital (up 11.2% over 2023), the total additional investment capital reached nearly USD 14 billion (up 50.4% over 2023).

Until 2024, foreign investors have invested in 18 out of 21 sectors of the national economy. In particular, the processing and manufacturing industry leads with a total investment capital of nearly USD 25.58 billion, accounting for 66.9% of the total registered investment capital, an increase of 1.1% compared to 2023. The real estate business industry ranks second with a total investment capital of USD 6.31 billion, accounting for 16.5% of the total registered investment capital, an increase of 18.8% compared to 2023. Next are the electricity production, distribution and wholesale and retail industries with a total registered capital of more than USD 1.42 billion and nearly USD 1.41 billion respectively; the rest are other industries such as construction, transportation and warehousing, information and communication, etc.

As an attractive destination for FDI in the ASEAN region, along with the green transformation trend, a number of large investors from Europe have chosen Vietnam to invest in green capital. Many large German corporations have followed the strategy of reducing emissions, which means that Vietnamese enterprises as suppliers and processors must also join in achieving this goal. Green FDI from other countries also flows into Vietnam with a number of projects such as LNG Bac Lieu, LNG Long An I and II... Green FDI from European countries - the 6th largest foreign investor in Vietnam, is expected to continue to grow in the coming time.

To welcome green FDI projects, the urgent requirement is to have clean infrastructure available for investors to build factories to serve production and business needs. Currently, the Vietnam has 425 industrial parks and export processing zones established with an industrial land fund of more than 89 thousand hectares, of which 299 industrial parks have come into operation, attracting huge capital, supplementing important resources for investment in socio-economic development of the country. In recent years, Vietnam has piloted the conversion of some traditional industrial zones into eco-industrial zones by promoting cleaner production and cooperation in production to efficiently use resources. The emergence of eco-industrial zones will create new momentum to convert industrial zones nationwide to new standards.

However, Vietnam still faces many difficulties, challenges and barriers in attracting green FDI, specifically: Vietnam does not have much experience and environmental mechanisms and standards to effectively screen FDI projects; Coordination between levels and sectors in controlling waste sources from FDI projects is not effective, synchronous and tight; There is still a situation of taking environmental protection lightly, especially in the process of appraisal, approval and implementation of FDI projects; The capacity of prevention, control and environmental protection of some FDI enterprises is still inadequate, the management capacity of relevant agencies has not yet met the requirements...

5. Implications for Vietnam

Based on experiences of some Asian countries like China, Singapore in attracting green FDI, there are some implications for Vietnam as follows:

- According to studies by the Organization for Economic Cooperation and Development (OECD), tax incentives or low tax burdens are not as attractive as a favorable business environment. Therefore, in the following years, the Government needs to continue to issue and effectively implement Resolution on improving the business environment and enhancing national competitiveness with an emphasis on reducing administrative procedures and business conditions; simplify business registration procedures, specialized inspections... Along with that, the Vietnamese Government also needs to implement solutions to improve infrastructure (traffic, information); Improve quality and ensure the supply of qualified labor...

- Building institutions, preferential policies, and competition, creating favorable business conditions to attract large, key national projects, high-tech projects... to attract strategic

investors, multinational corporations to invest, set up headquarters and establish research and development (R&D) centers in Vietnam.

- Giving priorities on attracting FDI into high-tech, advanced industries and fields, environmentally friendly technology, clean energy, renewable energy; high-tech agricultural production, smart agriculture; developing modern technical infrastructure, especially new industries on the basis of the Industrial Revolution 4.0.

- Establishing clearer legal definitions and standards for green FDI in line with international practices. This includes not only drafting comprehensive laws but also ensuring strict enforcement to protect environmental interests while facilitating business operations. Developing and promulgating criteria, standards and regulations on exploitation, use of natural resources and environmental protection in attracting and using FDI. Upgrading environmental standards to serve as a basis for not accepting projects that do not encourage investment (such as: dyeing and weaving using old technology...). Always ensuring the principle of "not attracting FDI at all costs"; Not extending or expanding operations for projects using low technology that do not meet technological and environmental standards.

- Reviewing and amending laws on technology transfer registration; import of machinery and equipment of FDI enterprises to control, promote technology and technology transfer; preventing and limiting fraud and acceptance of environmentally unfriendly technology.

- Developing appropriate incentive and preferential mechanisms to increase the linkage between FDI and domestic investment, priority areas to attract; developing industry clusters and value chains, contributing to increasing domestic added value, product competitiveness and national position in the global value chain. Encouraging technology and management transfer to Vietnamese enterprises.

- Strengthening inspection, supervision and examination work in conjunction with enhancing the responsibility of local authorities and leaders in implementing the Party's guidelines and policies and the State's laws related to foreign investment; promptly detecting, preventing and strictly handling violations of environmental protection.

- Training and coaching to improve the qualifications of the management team related to FDI, focusing on updating knowledge about green FDI capital trends; green FDI criteria in the world; experience in managing green FDI projects; experience in handling environmental risks including from FDI projects with "green commitment".

- Implementing incentives based on companies' environmental performance, thus not only encouraging the establishment of green projects but also encouraging continuous improvement and adherence to best practices. Developing modern green industrial parks equipped with the necessary infrastructure to support high-tech green industries. These areas can provide facilities for waste recycling, energy reduction and use of renewable energy sources.

Conclusion

Green FDI brings benefits in many aspects as: Environmental benefits, Economic benefits, Social benefits, Social benefits... Along with the strong determination from the government, ministries, sectors, and localities towards a green economy, Vietnam has a clear opportunity to attract FDI, especially for high-tech investment projects with minimal environmental impact from developed countries, gradually paving the way to attract actually green FDI projects in the near future. Based on experiences of some Asian countries in attracting green FDI, there are some implications for Vietnam.

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