

Foundations for Digital Transformation: The Case of Vietnam

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Abstract

Digital transformation is accomplished by a combination of people, businesses, technology and is led by a sound strategy, all of which are affected by the nation's digitalization environment. Thus, understanding this environment plays a critical role in not only shaping the future digital transformation of industries but also the digital transformation strategies of enterprises. This paper analyzes the digitalization environment in Vietnam by investigating the foundations for digital transformation, from which enterprises can foresee the opportunities as well as challenges on the road of digital transformation. Vietnam has created for itself solid foundations for digital transformation with the soaring of internet usage and large user base of social network, ambitious programs, directives and laws to promote a digitally empowered country. However, there are still challenges, including the cash-dominated payment behavior and the lacking of digital skills. Seizing the opportunities along with overcoming the challenges in customer behavior and human resources will help Vietnamese businesses build an appropriate digital transformation strategy.

Keywords: Digitalization environment, Digital transformation.

Introduction

Over the past 150 years, industrial revolutions have emerged at an ever-increasing rate, bringing about enormous changes in not only economic and cultural but also social, and political aspects of our lives. Looking back on history, the world has experienced various scientific and technological revolutions. The first industrial revolution, which started in 1780 and lasted for about 60 years, was about replacing human manual labor with mechanization, using steam power and engines. The second revolution from 1840 to World War I was the harnessing of electricity as well as a combination of other inventions from the late 19th century onwards. However, this revolution lasted only for 44 years: a shorter time but with a higher speed of spread. Due to the devastation of two World Wars (1914-1918 and 1939-1945), the involved countries were forced to put their efforts into economic recovery rather than invest in research and development, causing the speed of science and technology's development globally to slow down. Therefore, not only until the 60s of the last centuries that the third industrial revolution, which was driven by important inventions in many fields such as materials, renewable energy, space technology, biotechnology... and especially information technology began to take place. This revolution took place at a faster speed, has had a deeper impact, and was an important premise for humanity to enter the next industrial revolution. With this third industrial revolution, humanity has changed from the era of manufacturing technology to the era of high technology led by information technology, from manual labor to intellectual labor, from the national market to the global and regional markets. If an agrarian economy can be characterized by the imitation and accumulation of experiences, the first and second industrial revolutions are the era of production and inventions, then the third industrial revolution – the revolution of informationization, marks the era of innovation and creativity, paving the way for the introduction of the fourth industrial revolution. This revolution is featured by ubiquitous mobile internet, smaller and more powerful sensors, a fresh wave of Internet of things (IoT), Internet of system (IoS) and various innovations in such areas as driverless cars, 3D printing, artificial intelligence (AI), virtual reality (VR), augmented reality (AR), social networking, Big Data...

According to Klaus Schwab, the founder and executive chairman of the World Economic Forum, the breakthrough point of the fourth industrial revolution as compared to the third industrial revolution lies in the fact that digital technologies are “becoming more sophisticated and integrated and are, as a result, transforming societies and the global economy” (Klaus Schwab, 2016). One of the greatest historical transformations that the fourth industrial revolution has brought about is the emergence of digital transformation. In other words, digital transformation has become an extremely powerful tool toward sustainable development in our world nowadays. It is not exaggerated to say that the core of this revolution is digital transformation with the integration of digitization, connectivity, hyperlinking and intelligent data processing. The entire real world of humans can now be transformed into a "copied version" in the digital world and as a result, can be examined and processed in all dimensions of space, time, and speed in a subtle and intelligent way.

As an indispensable part of the fourth industrial revolution, in recent years, digital transformation has become a prime topic for many nations as well as enterprises across the globe. Vietnam is not an exception to this trend. Being one of the very first countries in the world to issue a strategy on National Digital Transformation, the Vietnamese government is putting effort into exploiting the impact of digital transformation to open up new development opportunities for the country. The digital transformation process in Vietnam is taking place at a rapid speed under three pillars: digital government, digital economy and digital society. In Huawei's Global Connectivity Index (GCI 2020), Vietnam ranks 55th out of 79 countries in terms of digital transformation, based on four criteria: levels of supply of information and communications technology (ICT) products and services, demand for connectivity, connectivity experience and potential for the future development of the digital economy. According to Cisco (2019), 64% of Vietnamese enterprises were aware of and benefitted from the government's support in digital transformation. In terms of investment, 18% of the enterprises invested in cloud technology, 12.7% in security, and 10.7% in upgrading IT software. This clearly shows that digital transformation is no longer a vision but has become a current and actual need that Vietnamese businesses need to implement and must be successfully implemented.

If looking at Huawei's Global Connectivity Index (GCI 2020), Vietnam has moved from the starting stage to the adopting stage of digital transformation in 2020. Even though this process has fundamentally changed the way we – Vietnamese - live, work and relate to one another, the road ahead still poses many issues that Vietnam will need to deal with in terms of not only economy, society, culture but also the environment. Thus, the purpose of this paper is to analyze the digitalization environment in Vietnam by investigating the current situation of the foundations for digital transformation in the country, from which policymakers, as well as enterprises, can foresee the opportunities and challenges on the road of digital transformation in this 4.0 era.

This study uses a synthesis method with data mainly taken from World Bank's data resources, data, and figures that have been published in previous reports, studies as well as Government's official statistical data...

The remainder of this research is outlined as follows: literature review and main conceptual issues; the significance of digital transformation in Vietnam; foundations for digital transformation in Vietnam; concluding thoughts and main implications.

1. Literature review and main conceptual issues

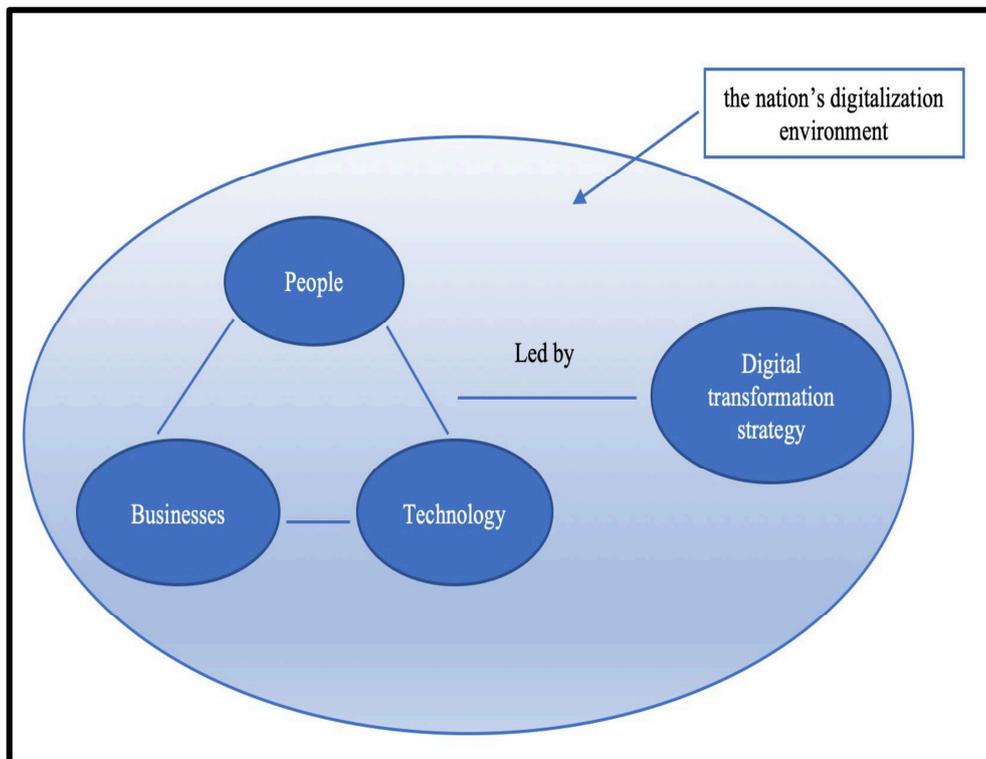
The term "Digital transformation" was first coined in 2011 by the consulting firm Capgemini in collaboration with the MIT Center for Digital Business. It was defined as "the use of technology to radically improve performance or the reach of businesses" (Westerman *et al*, 2011). Since then, this term has been so broadly used that there are currently diverse definitions as well as descriptions of digital transformation not only in academic but also in practitioner literature. Some definitions can be mentioned include: "the extent to which an organization engages in any activity of IT" (Mithas *et al*, 2013), "a business model driven by the changes associated with the application of digital technology in all aspects of human

society” (Henriette *et al.*, 2015), “concerned with the changes digital technologies can bring about in a company’s business model, which result in changed products or organizational structures or in the automation of processes” (Hess *et. al.*, 2016), “the use of digital technology, in order to enable major business improvements in operations and markets such as enhancing customer experience, streamlining operations or creating new business models” (Paavola *et al.*, 2017) ... In this paper, we do not focus on assessing the extent to which these definitions reflect the nature of digital transformation, instead, do emphasize the commonality in these definitions and the use of digital technologies.

However, it is important to note that although technology is an irreplaceable ingredient in digital transformation, technology, itself, is not the only force that drives digital transformation but a sum of factors, which are presented in Figure 1.

From the perspective of strategic management, understanding the external environment plays a critical role in not only shaping the future of industries but also the strategies of enterprises, including digital transformation strategies (Ansoff, 1987; Wholey and Brittain, 1989; Bettis and Hitt, 1995; Lumpkin and Dess, 1996). Put another way, external environment analysis, to any strategy developer, is a key input into strategy formulation. The core element of a sound strategy is that it can utilize opportunities and overcome challenges. Therefore, so as to be ahead in the ongoing competition of the business world, it is a must for managers to keep adjusting their strategies to reflect changing trends of the external environment, in which their enterprise operates in. As a matter of course, understanding the external environment is also crucial to develop digital transformation strategy.

Figure 1: Factors affecting digital transformation



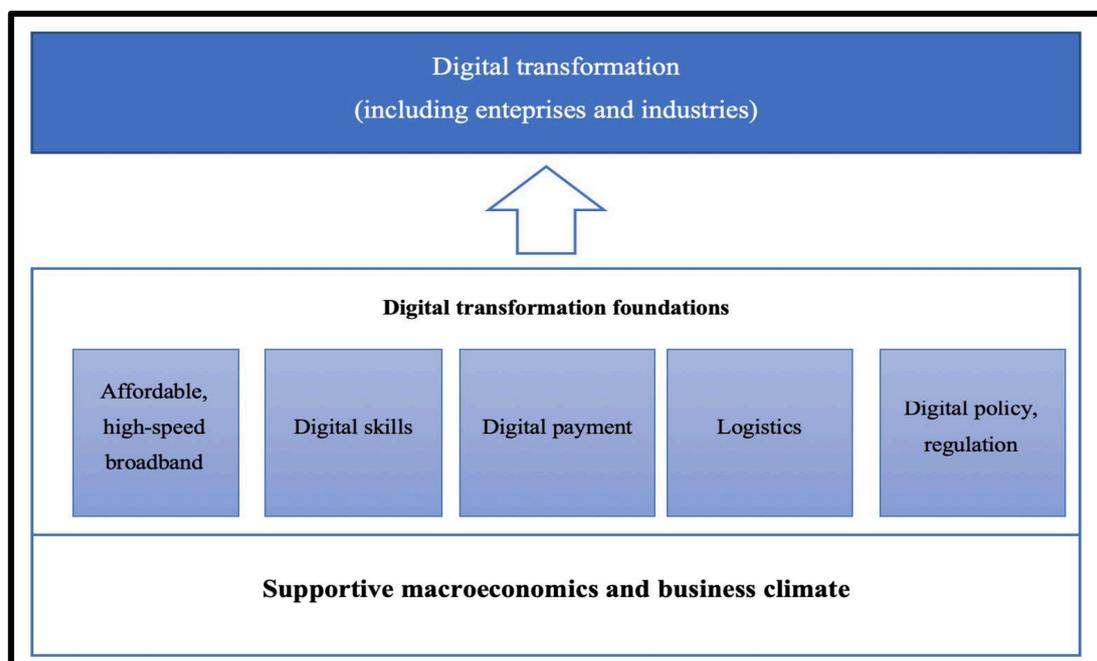
Source: The author’s depiction.

More specifically, digital transformation requires the alignment of a sound strategy and such factors as people, culture, mindset, talent development, and leadership (Kane *et al.*, 2015; Goran *et al.*, 2017; Tabrizi *et al.*, 2019; Nadkarni *et al.*, 2020; Verhoef *et al.*, 2021). In other words, digital transformation is accomplished by a combination of people, businesses, technology and is led by a sound strategy, all of which are affected by the nation’s digitalization environment because after all, any business, organization or individual exists in the environment and is affected by it.

In terms of the nation’s digitalization environment, besides the supportive macroeconomics and business climate, there are five major factors that can shape the digital transformation within the enterprises as well as industries, including internet connectivity, digital skills, digital payment, logistics, digital policies and regulations. These factors are presented in Figure 2.

With digital technologies underpinning its transactions, digital transformation is undeniably inseparable from digital infrastructure. It is true that digital infrastructure in general, internet connectivity in specific is fundamental for digital transformation, especially when a stable and affordable connection can be considered to be a prerequisite for digital transformation. Besides, many countries nowadays, are facing the challenge of a clear division between rural and urban areas in terms of internet access, which can be considered a hinder to digital transformation. Without developing a digital infrastructure system with the internet being its basis, there cannot be any fundamental change in any technology sector at the national level in the world of global competition. That is why the technology-advanced countries all come along with a solid background in information technology and digital technology.

Figure 2: Foundations for digital transformation



Source: Adapted from World Bank 2019 Report “Foundations for growing the digital economy in Southeast Asia”.

Another not less important factor is digital skills. The diffusion of digital technology as well as the digitalization of business processes in any country requires the consideration of its people's abilities. Along with the emergence of the fourth industrial revolution is the appearance of many new industries as well as the continuous changing of workplace demands, requiring more adaptive human resources, especially with new digital and managerial skills. This has made it significant for the establishment of what is called "the right-skill mix", which can only be achieved through the restructuring of the education system and the promotion of lifelong learning.

Finance is not only the enabler of the digital economy but also the sector that has changed significantly as a result of digitalization. Being the means of payment for goods and services from a distance, digital payment is one of the main supports for the achievement of digital transformation in the economy. Besides, the development of the digital payment systems can also assist people where access to financial services is limited.

Like finance, the logistics sector is also being impacted greatly by digital technology and at the same time, is an enabling factor for the widespread digital transformation. Most importantly, the increasing efficiency of logistics sector also means the improvement of e-commerce supply chain.

Last but not least prerequisite is the government's digital policies and regulations, with the main aim to promote trust among the people when conducting internet or digital activities as well as bring about supportive mechanism or a clear legal framework for digital transformation through national programs.

2. The significance of digital transformation in Vietnam

From the enterprise's perspective, digital transformation will comprehensively change the way a business operates, increase cooperation efficiency, optimize work performance, and bring value to customers. How about from a national perspective? In this section, we would like to explain the reason why Vietnam needs to accelerate digital transformation within the country.

The concept middle-income trap was first coined by Indermit Gill and Homi Kharas in 2007 in the report "An East Asia Renaissance: Ideas for economic growth". It refers to a state that, although has been able to get out of poverty and joined the group of middle-income countries, then failed to shift to the position of a developed country even after decades. Today, Vietnam is considered a development success story, one of the world's leading emerging markets. Along with the transition from the centrally planned economy to the market economy with socialist orientation, Vietnam has moved from the group of countries with the lowest income in the world (underdeveloped countries) to the group of developing countries with low income. In 2009, Vietnam one more time shifted its position to the low middle-income countries when the average GNI per capita in 2008 was USD 1,000/person. Since then, this indicator has increased every year but always remained within the lower middle income limit. Having just stepped into the middle-income threshold for 12 years, Vietnam is still in the first stage of the industrialization process. Therefore, the time factor is not long enough for researchers to confirm that Vietnam has fallen into the middle-income trap. However, this does

not mean that this trap is not waiting for Vietnamese economy to fall into because historically, there are very few countries that could escape this trap. Besides, Vietnam's current development path is quite similar to these countries, which is depending on currently available competitive advantages and foreign factors without concerning the idea of intrinsic value creation. Meanwhile, up to now, business activities in Vietnam are still classified as those of the first three industrial revolutions. Moreover, Vietnamese businesses are still in a low position in the global value chain. In fact, to date, Vietnam is still a transitional economy. Thus, the institutional foundations of the market economy still need to be improved, not to mention having to meet the new requirements of deeper integration into the era of Industry 4.0 and digitalization.

With all of the mentioned above characteristics of the economy, it is true to say that at the current time, Vietnam stands really at a turning point in development – a turning point for innovation and creativity, which can be achieved through the digitalization of not only the economy, the society but also the government. Low-cost, low-skilled, low-productivity labour and primitive, low value-added manufacturing industries are no longer the right formula for development in this 4.0 era. In fact, embracing the economy with digital transformation, establishing new industries and enterprises, and most importantly, upgrading the workers' skills have become a priority, especially in helping countries to move out of the middle-income range to the advanced economy status (Microsoft, 2019). To be more precise, digital transformation can not only help increase productivity and reduce cost, but also create new growth engines for the economy. McKinsey's research (2015) points out that by 2025, digital transformation could add up to USD 2.2 trillion to US's annual GDP. In European countries, this figure is estimated to be EURO 2.5 trillion (McKinsey, 2016). According to Axiata and Kearney (2020), if ASEAN countries undergo a strong digital transformation, in 2030 ASEAN GDP will have an additional USD 1 trillion. Thus, it can be seen that digital transformation has a great impact on GDP growth. In addition, Microsoft's research (2018) shows that, in 2017, the impact of digital transformation on labor productivity growth was about 15% and by 2020, this figure will be 21%. With aspirations to move into the group of upper-middle income countries by 2035 and preventing itself from falling into the middle-income trap, it is high time that the Vietnamese government aimed toward the digital economy so as to power its next era of development.

The period starting from the end of 2019 to date, along with the Covid-19 pandemic, has brought about the risk of falling in another trap for Vietnam besides the middle-income trap: the Covid-19 economic trap, referring to the fact that this pandemic will most likely increase poverty and inequalities as well as pressure on the economic development of the country. In the "Asian Development Outlook Report", the Asian Development Bank (ADB) estimated that global damage caused by Covid-19 could be up to USD 4,100 billion, equivalent to nearly 5% of world GDP. At the United Nations Conference on Trade and Development (UNCTAD) in 2021, experts warned that the new corona virus strain could cause a loss of over USD 4 trillion to the global economy. As an indispensable fact, Vietnam does not lie outside this "spiral" of damage. Vietnam's GDP growth rate in the first half of 2020 was only 1.8%, the lowest in the past 3 decades. FDI inflows decreased by 15% to USD 16 billion pledged.

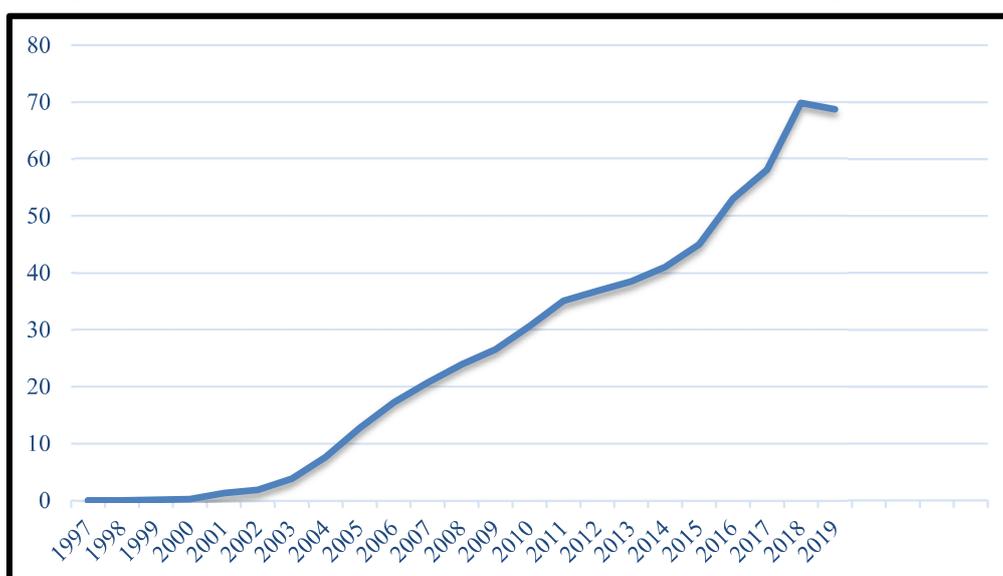
Budget revenue decreased by 35% in June (YoY). The service sector was affected the most, with a growth rate of only 0.6%. Covid-19 also affected 30 million people, almost half of the workforce. The urban unemployment rate increased by 33% to nearly 4.5% (World Bank, 2020). However, there are always two sides of a coin. Viewing in another perspective, this can be considered as an opportunity for the economy to regenerate, if we see it as an inevitable cycle, or a natural selection. Covid-19 for the digital economy is a significant boost, especially for businesses to engage in digital transformation from corporate governance to online sales. In reality, many Vietnamese businesses have never sold products online; many Vietnamese customers have never bought products online; during the pandemic, especially lockdown time, all have started to go online for their survival. Even many high-value items which have never been able to be sold online, can now be found on the online marketplace. It is noteworthy that approximately 60% of Vietnamese businesses use online platforms and tools, and more than 2,000 administrative procedures in Vietnam have gone online (Nhat P., 2021). These are the bright spots in the context of Covid-19 in Vietnam.

It is true that when facing the urgent need to recover rapidly, inclusively, and sustainably, the major goal of the Vietnamese government is to build a digital economy, digital government and digital society. More than ever before, the fourth industrial revolution and digital transformation can make a major contribution to the achievement of these long-term sustainable growth goals. Speaking at the opening ceremony of the ITU Digital World 2020, which was officially held in Hanoi on 20th October 2020, Deputy Prime Minister Vu Duc Dam has emphasized the vital role of telecommunications and information technology in the context of the complicated Covid-19 pandemic. Digital technologies have become an important tool to help countries not only control the Covid-19 but also adjust and adapt to the new context during and after this pandemic. Deputy Prime Minister also affirmed that digital infrastructure and information technology development is among the top priorities and emphasized that digital transformation is a national strategic program, an important solution to bring the country a fast and sustainable development.

3. Foundations for digital transformation in Vietnam

3.1 Internet connectivity

November 19th, 1997 is the first day when Vietnam was integrated into the global internet. Since then, Vietnam's internet has grown from scratch to 72.10 million internet users by January 2022. In other words, 73.2% of Vietnamese population is online, marking a significant increase from 36.8% just a decade ago (see Figure 3). From 2021 to 2022, the total number of internet users in Vietnam increased by 3.4 million, indicating an increase of more than 4.9% (Kemp, 2022).

Figure 3: Individuals using the Internet in Vietnam (% of population)

Source: World Bank (2022).

In fact, Vietnam is currently one of the countries with the fastest growth and use of the Internet and social networks in the world, with an average of 6 hours 38 minutes spent on internet every day. Specifically, Vietnamese users spend an average of 2 hours and 28 minutes using social networks (Kemp, 2022). This proves that information technology, including social networks, has been widely used in the life and socio-economic activities in Vietnam. Figures in January 2022 show that there were 76.95 million social media users in Vietnam. This number increased by 5 million (about 6.9%) between January 2021 and January 2022, accounting for 78.1% of the total population (Kemp, 2022). Currently, Vietnam has more than 240 social networking sites and 63 integrated digital news outlets, among which Facebook is the most popular (Ministry of Information and Communications, 2017). According to Statista (2022), Vietnam ranks 7th in terms of largest user base on Facebook, with 74.1 million active users as of October 2021 (only behind India, United States, Indonesia, Brazil, Mexico and the Philippines). Along with Facebook, other social networking sites have also operated in Vietnam, for instance, Zalo, a “Made-in-Vietnam” social network released by VNG since 2012, with a user base of up to more than 100 million people worldwide (mainly from Vietnam, USA, Myanmar, Japan, South Korea, Taiwan...) (Minh Son (Vietnam+), 2019). Table 1 below shows the top three social media platforms in Vietnam as compared to other countries in the region.

Table 1: Leading social media platforms in Asia (2016)

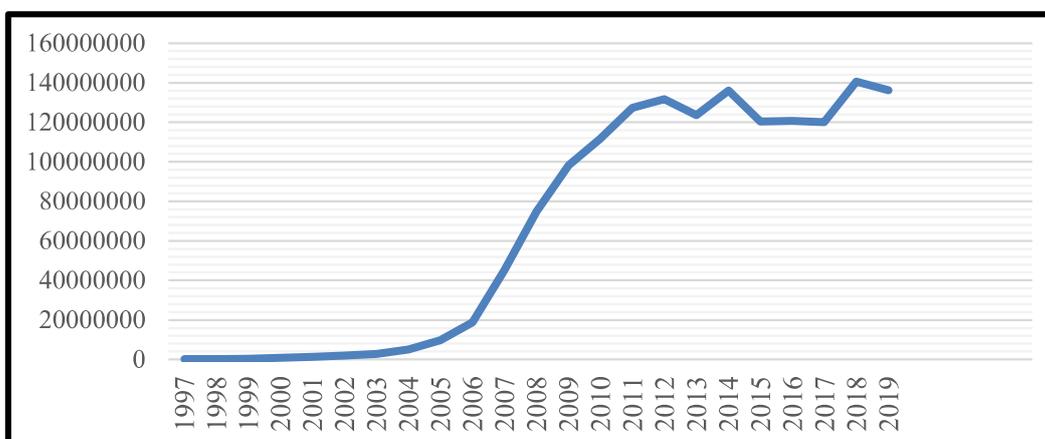
Country	Ranking of top three social media platforms
China	(1) WeChat (2) Ozone (3) Line
India	(1) Facebook (2) WhatsApp (3) Facebook Messenger
Indonesia	(1) Blackberry Messenger (2) Facebook (3) WhatsApp
Philippines	(1) Facebook (2) Facebook Messenger (3) Skype
Vietnam	(1) Facebook (2) Zalo (3) Facebook Messenger
Thailand	(1) Facebook (2) Line (3) Facebook Messenger
Korea, Rep.	(1) TALK (2) Facebook (3) KakaoTalk
Japan	(1) Line (2) Facebook (3) Twitter

Source: RVC (2016).

It is undeniable that the Internet has also become an important tool in information exchange among enterprises, especially import-export enterprises. In 2016, nearly half of Vietnamese businesses (49%) owned websites and about onethird (32%) have established relationships with foreign partners through online channels (Vietnam E-Commerce and Information Technology Agency, 2016).

When having to choose between fixed broadband and wireless, a majority of Vietnamese would probably go for wireless. As analyzed by Cameron (2019), “Vietnam’s internet use is dominated by mobile phones”. By January 2021, Vietnam had 154.4 million mobile connections, accounting for 157.9% of the total population (Kemp, 2022). In other words, many Vietnamese owns more than one mobile subscription. Figure 4 below shows the development trend of the number of mobile subscriptions in Vietnam from 1997 to 2019. The number of mobile subscriptions in 2019 increased by 16.3 million compared to 2017, with more than half of the mobile phones used being smartphones with Internet access.

Figure 4. Mobile subscription in Vietnam (1997 – 2019)



Source: World Bank (2022).

It is noteworthy that Internet price in Vietnam is among the cheapest in the world. In particular, according to Cable.co.uk, Vietnam ranks 3rd in Asia, 13th in the world, and 1st in Southeast Asia in terms of cheap fixed broadband internet rates in 2022 (see Table 2). Like fixed broadband rate, mobile internet rate in Vietnam is also one of the cheapest rates in the world, ranks 4th in Asia, 15th in the world and 2nd in South East Asia (see Table 3).

Not only in terms of quantity, Internet in Vietnam has also expanded in terms of quality. In 2022, Vietnam ranks 53rd in the world for mobile speeds and 46th for broadband speed with the average download speed in mobile phones to be 35.29 MBPS and upload speed in mobile phones: 16.89 MBPS; the average speed for fixed broadband being 71.79 MBPS and 67.20 MBPS, respectively (Speedtest global index, 2022). In 2009, 3G mobile wireless services were launched, and later in the beginning of 2016, 4G services were licensed. Currently, 4G networks cover over 99.8% of the country's population. In September 2020, 5G network has been piloted in Vietnam and will be commercially rolled out in 2022. Vietnam aims to reach 25% of 5G network coverage by 2025. Besides, it is expected that by December 2022, only 5% of ordinary phone users still use 2G. This means that from 2023, 100% of mobile users in Vietnam will be ready to use the internet. However, of course, there is still a gap between the rural or mountainous areas and urban areas.

Table 2: Top 20 countries with lowest broadband pricing

Rank	Country	Average cost of broadband (Per month in USD)
1	Syria	USD 2.15
2	Sudan	USD 4.80
3	Belarus	USD 7.39
4	Ukraine	USD 7.40
5	Russian Federation	USD 8.07
6	Moldova	USD 8.21
7	Mongolia	USD 8.80
8	Romania	USD 9.00
9	Turkey	USD 9.32
10	Kazakhstan	USD 9.46
11	Iran	USD 10.46
12	Bulgaria	USD 10.67
13	Vietnam	USD 10.81
14	Kyrgyzstan	USD 10.97
15	Lithuania	USD 11.13
16	Nepal	USD 11.70

17	Georgia	USD 11.78
18	Armenia	USD 13.16
19	Uzbekistan	USD 14.38
20	Tunisia	USD 14.79

Source: Cable.uk.co (2022).

Table 3: Top 20 countries with lowest mobile data pricing

Rank	Country	Average price of 1GB (USD)
1	Israel	USD 0.05
2	Kyrgyzstan	USD 0.15
3	Fiji	USD 0.19
4	Italy	USD 0.27
5	Sudan	USD 0.27
6	Russian Federation	USD 0.29
7	Moldova	USD 0.32
8	Bangladesh	USD 0.34
9	Sri Lanka	USD 0.38
10	Chile	USD 0.39
11	France	USD 0.41
12	Indonesia	USD 0.42
13	Belarus	USD 0.43
14	San Marino	USD 0.43
15	Vietnam	USD 0.49
16	Algeria	USD 0.51
17	China	USD 0.52
18	Samoa	USD 0.56
19	Pakistan	USD 0.59
20	Kazakhstan	USD 0.59

Source: Cable.uk.co (2022).

3.2 Digital skills

In the context of the fourth industrial revolution or digital transformation, there will be a wave of strong and swift impacts on the labors. When the majority of Vietnamese people are still lacking of understanding of the Industrial revolution 4.0, the impact of this revolution has, indeed, come very close. A study by the International Labor Organization in 2016 estimated

that Vietnam, Cambodia, Indonesia, Philippines, and Thailand are at the highest risk of displacement by automation in production in Southeast Asia for the next decade to come. More specifically, 70% of Vietnamese workers will be at high risk of automation.

Even though among Southeast Asian countries, Vietnam is the second largest labor market, Vietnam is perceived as still being lag behind high-income countries in terms of digital skills. According to World Economic Forum's Competitiveness Report (2019), Vietnam ranks at the bottom of the region in terms of digital skills available in the labor force (Vietnam ranks 97th, whereas Singapore - 5th, Malaysia - 11th, The Philippines - 22nd, China - 45th, and Thailand - 66th). Moreover, in the Global Talent Competitiveness Index 2020, with the main theme of Global Talent in the Age of Artificial Intelligence, Vietnam ranks 96th out of 132 countries. In fact, the country has fallen five positions compared to 2019 and nine positions compared to 2018. So as to proactively deal with the emergence of AI and digital technology in the workplace, what is crucial for Vietnamese government at this stage is to prepare the future workforce with digital skills as well as reskill the existing workforce. The scope for improvement would probably lie in vocational and technical skills, where the ranking is rather low in comparison with other countries in the region (see Table 4)

Table 4: Global Talent Competitiveness Index 2020

	GTCI Ranking	Global Knowledge Skills	Vocational and Technical Skills
Singapore	3	1	5
Malaysia	26	33	15
Brunei Darussalam	38	37	25
Philippines	46	32	61
Indonesia	65	84	55
Thailand	67	61	86
Vietnam	96	59	117
Laos	98	48	100
Cambodia	117	112	125

Source: INSEAD (2020).

As the foundation for digital skills development, the next generation of Vietnam's workforce is believed to be rather productive, showing in the high human capital index. Vietnam's HDI is the second highest in the region (only behind Singapore) (see Table 5). As defined by the World Bank, HDI consists of three main components: Survival, School, and Health, which are converted into ratios that contribute to future expectations and is a decisive factor to the adoption of new technology. Thus, it affects economic growth in general and digital transformation in specific. With approximately 0.69 points, Vietnam's future workforce

will not meet many difficulties when adopting new digital skills as well as adapting to the digital transformation.

Table 5: ASEAN's Human Capital Index

Country	2010	2017	2018	2020
Vietnam	0.656642	0.666	0.687239	0.689965
Singapore	0.847186	0.884	0.887084	0.879126
Malaysia	0.584345	0.622	0.632579	0.610976
Myanmar	..	0.473	0.471833	0.477652
Brunei Darussalam	0.626391
Philippines	..	0.548	0.549016	0.515962
Indonesia	0.496361	0.535	0.537957	0.540038
Thailand	0.584985	0.604	0.616861	0.609311
Lao PDR	..	0.452	0.456815	0.456665
Cambodia	..	0.493	0.490685	0.49159
Timor-Leste	0.410666	0.434	0.453052	0.454315

Notes: (..) means No data available.

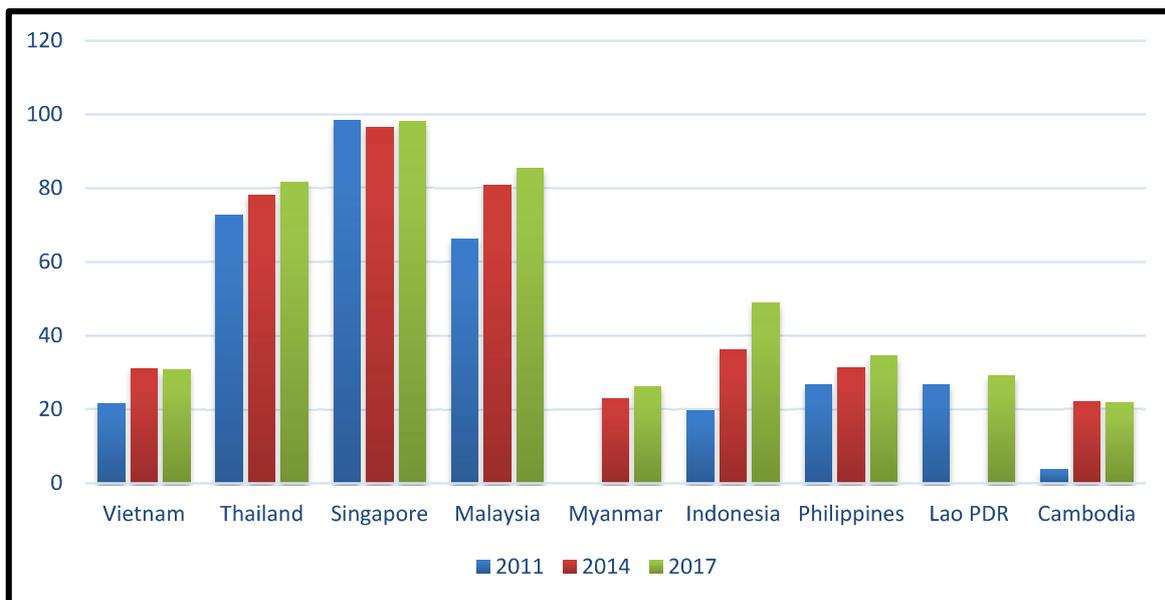
Source: World Bank (2022).

3.3 Digital payment

As can be seen from Figure 6, from 2011 to 2017, the number of account owners at a financial institution or with a mobile-money-service provider (as % of population ages 15+) increased from 21.37% to 30.79%. At first sight, this number is still low compared to other countries in the region, including Singapore, Malaysia, Thailand and Indonesia. However, we can not deny the fact that e-banking services in Vietnam has been developing in a diversified and flexible way, suiting the needs and development trends of the market.

With the support from the Government as well as the Government's target to reach 80% of the population to have an electronic payment account and attain the rate of e-commerce payments of 50% by 2025, electronic payment in Vietnam is changing in a more positive direction. Digital payment is evolving in Vietnam in such a rapid way, along with the strong development of both traditional and modern electronic payment applications with more than 78 organizations, Internet payment service providers and 45 organizations providing mobile payment services. Specifically, revenue from the electronic payment market in 2020 has grown by 14.2% over the same period in 2019, the revenue achieved is USD 8,904 million. The number of users also grew to 36.2 million, up 12.1% from 2019 (TopDev, 2020). According to the APEC e-Payment Index, Vietnam currently ranks 20th in the level of readiness and potential to engage and reap the benefits of e-payments (Singapore ranks second, Malaysia ranks 10th, Brunei Darussalam ranks 11th, Thailand ranks 15th, Indonesia ranks 16th, the Philippines ranks 17th).

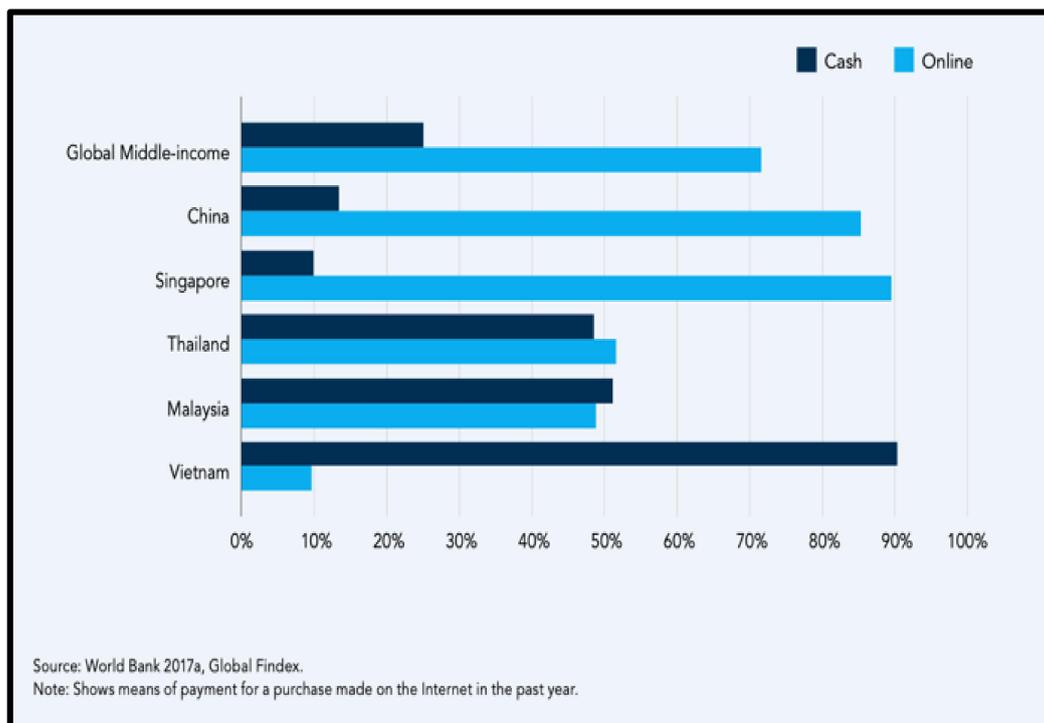
Figure 6: Account ownership at a financial institution or with a mobile-money-service provider (as % of population ages 15+)



Source: World Bank (2022)

However, one of the main characteristics of the payment landscape in Vietnam is that Vietnamese consumers still tend to prefer cash as their main method of payment. According to World Bank (2019), only 10% of Vietnamese users pay online to buy goods on the Internet, which is significantly lower than in Indonesia and Malaysia (see Figure 7). This means that 90% of e-commerce consumers in Vietnam use cash to buy online.

Figure 7: Means of payment by internet purchase



Source: World Bank (2019).

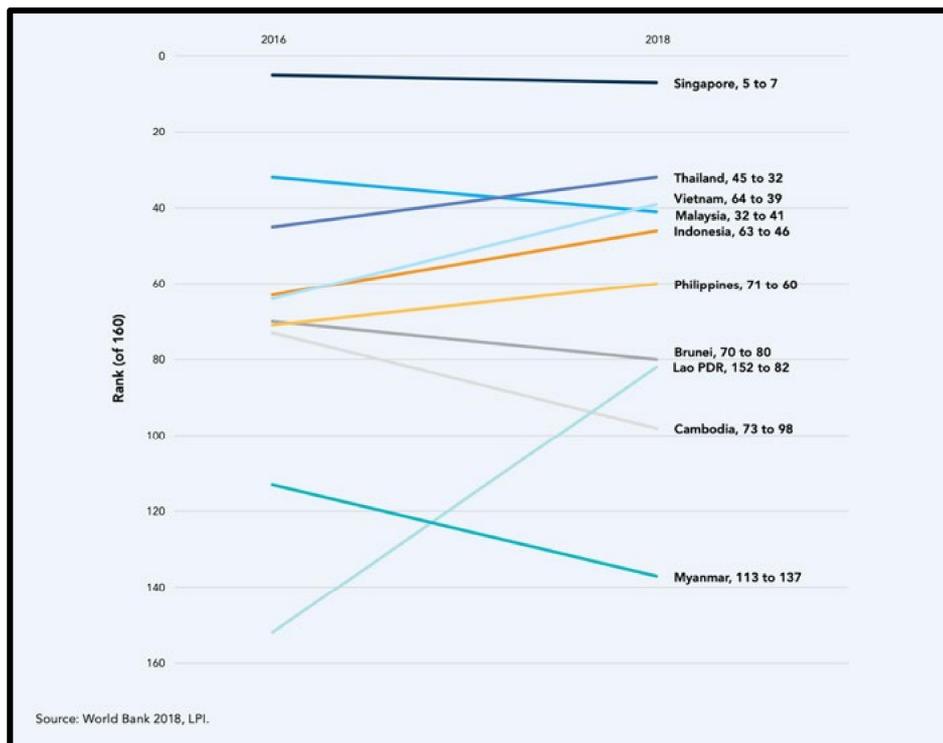
3.4. Logistics

Along with the uptrend of digital transformation, logistics sector in Vietnam has also grown rapidly at an average rate of 14% - 16% (USD 40 billion – USD 42 billion) per year (Ministry of Industry and Trade of Vietnam, 2017) with the emergence of such new types of logistics services as door-to-door delivery, last-mile delivery ...

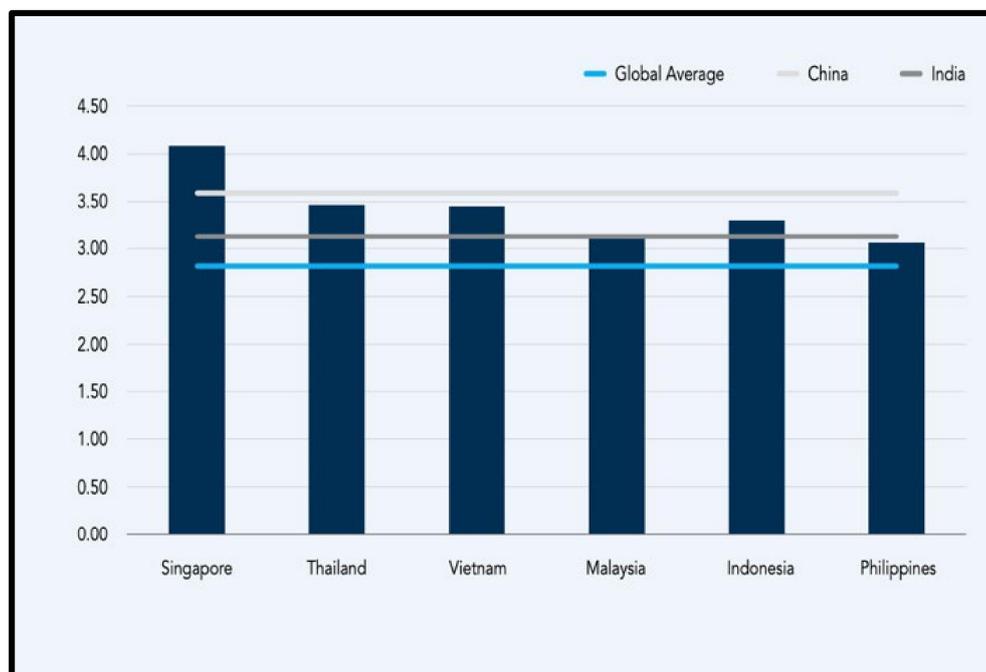
According to World Bank’s Logistics Performance Index (LPI) in 2018, Vietnam’s performance in logistics shows a considerable rise from 64 in 2016 to 39 in 2018, lying among the top 25% in LPI (see Figure 8). Most importantly, many of the enterprises in this field are transforming from a traditional type to a digital type. In other words, the number of logistics enterprises apply technology in their operation as determined by Vietnam Logistics Business Association has increased from 15% - 20% to 40% - 50% (Vietnam Logistics Business Association).

In addition, as can be seen from Figure 9, the quality and competence of logistics services in Vietnam are relatively strong in comparison with the world’s average or India’s performance. However, in general, Vietnam still falls low compared with China’s logistics services.

Figure 8: Logistics performance index ranking



Source: World Bank (2019).

Figure 9: Logistics quality and competence of selected Asian countries in 2018

Source: World Bank (2019).

3.5. Digital policies and regulations

2020 is the year when Vietnam declares its national digital transformation strategy - a year of deep and comprehensive national digital transformation. Prime Minister Nguyen Xuan Phuc signed the first Directive in January 2020 - Directive No.01/CT-TTg - on promoting the development of digital technology enterprises in Vietnam. The directive clearly states that, based on the foundation of new technologies whose core is digital technology (artificial intelligence, big data, blockchain, cloud computing, Internet of things ...), digital transformation is creating a new development space - digital economy, digital society, e-government. "In particular, digital transformation opens up great opportunities for Vietnam to develop a breakthrough and quickly catch up with developed countries, which have only just begun the digital transformation process," the Prime Minister stated in the Directive. Also, according to this Directive, models of some countries with developed economies based on digital technology enterprises show that, by 2030, Vietnam needs at least 100,000 digital technology enterprises to develop its digital economy, smart cities, e-government, apply digital technology achievements widely in socio-economic fields and carry out national digital transformation. On June 3rd, 2020, the Prime Minister issued Decision No. 749 / QD-TTg approving the "National Digital Transformation Program to 2025, with an orientation to 2030" with the goal that Vietnam will be among the top 50 countries in e-Government (EGDI). The National Digital Transformation program aims at developing digital government, digital economy, digital society, and forming Vietnamese digital technology enterprises with global capacity. Regarding digital economic development, improving the competitiveness of the economy, the target by 2025 is that the digital economy will account for 20% of GDP; the proportion of digital economy in each branch or field will reach at least 10%;

annual labor productivity increases at least 7%; Vietnam will be in the group of 50 countries leading in information technology (IDI), in the group of 50 countries leading in the competition index (GCI), in the group of 35 countries leading in innovation (GII)...

Before 2020, Vietnamese government had recognized the great potential of an economic growth model based on science, technology and innovation, in which digital economic development is seen as an inevitable trend to create an economic growth engine for Vietnam in the context of the ongoing Industrial Revolution 4.0 wave. This can be proven in the government's numerous decisions as well as directives and laws in order to prepare the foundation for digital economy's development within the country. Some of the current major policies are listed in but not limited to Appendix 1.

In terms of government agency that is directly in charge of supporting and regulating of the digital economy, it has to be said that at the moment, all such aspects of digital economy in Vietnam are directed by multiple agencies ranging from Ministry of Science and Technology; Ministry of Information and Communication; Ministry of Education and Training; Ministry of Labor, Invalids and Social Affairs; Ministry of Finance; Ministry of Industry and Trade; Ministry of Planning and Investment; People committees of provinces... to National committee for Information Technology Application. In other words, to date, no single agency governs all activities of digital economy in Vietnam. On 5th October 2017, Vietnam E-commerce and Digital Economy Agency was established. This department is an organization under the Ministry of Industry and Trade, performing the function of advising and assisting the Minister of Industry and Trade in state management and law enforcement in e-commerce and digital economy activities; organizing and managing public service activities in the scope of the Department's management according to the provisions of law and the decentralization and authorization of the Minister (iDEA, 2017). Further on, what Vietnam needs in the near future, when the 4th industrial revolution, with the core of digital transformation, affects the whole economy, society and national governance, is the establishment of Ministry of Digital economy. This ministry should be in charge of building digital infrastructure, platforms... for the digital economy as well as for economic and social sectors (Vneconomy, 2019).

4. Concluding thoughts and main implications

4.1. Concluding thoughts on opportunities of and challenges for digital transformation in Vietnam

According to World Bank's Global Economic Prospects report (2022), the global growth rate is forecasted to decrease from 5.5% in 2021 to 4.1% in 2022 and even down to 3.2% in 2023, a point which can be considered as a recession with the world economy. The rapid spread of the Omicron variant indicates a threat to global economic activity in the near future. Indeed, there will be a huge disparity between developed and developing economies. When looking at economic recovery from recession, it is thought that no matter how strong the storm is, if the economy is resilient enough, it will still overcome. The Covid-19 pandemic has made us realize one fact that the success in dealing with any crisis does not come from whether enterprises react quickly or

slowly, but from whether they have prepared a solid and resilient foundation or not. It is clearly that the world's current undeniable trend is to develop a competitive advantage from digital transformation. In other words, in today's world, the agility competitive advantage of nations in general and enterprises in specific can only be achieved through digital transformation.

About 15 years ago, people did not have any clear concepts and ideas related to digitalization, digital transformation and digital economy. Nonetheless, nowadays, embracing technology, transforming the management and operation model into a higher level of efficiency is the matter of survival not only to nations but also to any organizations and enterprises. It is difficult to have a general formula for an organization to be digitalized successfully because each business will have different needs and goals for digital transformation. The formula of success in one business does not secure success in another. What is most appropriate is that an enterprise must have a thorough understanding of the nation's broad digitalization environment so as to identify the possible opportunities as well as threats before thinking about digital transformation. The key to building a sustainable digital transformation strategy is to understand what the landscape of digital transformation in the country is.

When looking at the digital transformation process in Vietnam toward the development of a digital economy, a digital society, and a digital government, one fact that can be seen is that Vietnam has created for itself a solid foundations with many opportunities coming from the soaring of internet usage with large user base of social network and affordable, high-speed broadband; ambitious programs, directives and laws by the Government to promote a digitally empowered society, economy and government; the rising of non-cash payment methods usage; an increasing number of technology-enabled logistics companies as a support to digital economic activities. Nevertheless, there are still challenges for digital transformation in Vietnam, including the characteristics of Vietnamese society, which is still cash-dominated, and most importantly, the lacking of digital skills, especially in comparison with other high-income countries.

4.2 Main policy implications

Seizing the opportunities from the digital transformation environment, along with overcoming the challenges in customer behavior and human resources will be the very first steps to help Vietnamese businesses to build an appropriate digital transformation strategy. The following policy implications are noteworthy for government as well as policymakers:

- Measures to adequately develop digital skills should be a top priority to ensure that Vietnamese citizens' digital skills do not become a barrier to digital transformation nationwide. It is worth to emphasize that digital skills are not only "coding" or "software programming" but also the digital literacy for everyone to promote the adoption, adaptation, diffusion and development of digital technologies as well as their applications.
- Measures to adequately regulate and integrate digital payment methods into the digital ecosystem so as to enable the transition from a cash-dominated society to a cashless society.

- Measures to adequately develop and expand digital infrastructure since digital transformation relies on a solid infrastructure and is the most basic pre-requisite for digital transformation.
- Measures to adequately monitor the logistics industry to support the digital transformation in other industries, especially the e-commerce sector.

Measures to adequately implement tight security and privacy of data to protect both the consumers and the enterprises.

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Appendix

Appendix 1: Vietnamese government’s digital policies and regulations

<p style="text-align: center;">Law</p>	<ul style="list-style-type: none"> • Law on e-transaction (2005) • Law on intellectual property (2005) • Law on information technology (2006) • Law on high technology (2008) • Law on technology transfer (2008) • Law on telecommunication (2009) • Law on radio frequency (2009) • Law on network information security (2015) • Law on cybersecurity (2018)
<p>Decrees, directives and decisions</p>	<ul style="list-style-type: none"> • Decision No. 74/QD-TTg (2006): approving the program on the provision of public telecommunications services toward 2010 • Decree No. 35/ND-CP and No. 27/ND-CP (2007) on e-banking and e-finance • Decree No. 97/ND-CP (2008) on internet services and electronic information on the internet • Decision 418/QD-TTg (2012): approving the science and technology development plan 2011-2020 with emphasis on digital technologies • Decree No. 52/ND-CP (2013) on e-commerce • Decision No. 1168/QD-TTg (2015) and No.868/QD-TTg (2018): The program on the provision of public telecommunications services until 2020 • Decision No. 392/QD-TTg (2015): setting targets on information technology development through to 2020 with a vision toward 2025; • Decision No. 149/QD-TTg (2016): setting goals for broadband and telecommunications infrastructure development through to 2020; • Directive 16/CT-TTg (2017): strengthen progress towards Industry 4.0.

	<ul style="list-style-type: none"> • Decision No.1563/ QĐ-TTg (2017): approving the overall plan for e-commerce development 2016-2020 • Decision No.1072/QĐ-TTg (2018): establishing the national e-government committee • Resolution No. 17/NQ-CP (2019) regarding certain key tasks and measures of development of the electronic government for the period 2019- 2020, with vision towards 2025 • Resolution No.1/ NQ-CP (2019) on key measures to implement socio- economic development plan and State budget estimate in 2019: issue the National strategy on implementing Industrial revolution 4.0; Resolution on improving capacity to approach Industry 4.0 toward 2025; and Solution to develop national human resources to meet the requirements of Industry 4.0. • Resolution No.2/NQ-CP (2019) on continued implementation of major tasks and solutions for improving the business environment and national competitiveness in 2019 and orientation to 2021: develop the scheme for the National Innovation Center; develop solutions to master key Industry 4.0 technologies, deploy the scheme “Developing the Digitalized Knowledge System” and promote e-payment
<p>Master plans and initiatives</p>	<ul style="list-style-type: none"> • Vietnam post, telecommunications and information technology strategy until 2010 and orientations toward 2020 • Master plan on Vietnam’s electronics industry up to 2010, with a vision toward 2020 • National planning on development of IT security through 2020 • The target program on IT development through 2020, with a vision toward 2025

	<ul style="list-style-type: none">• The program on development of broadband telecommunications infrastructure through 2020• Scheme to support the national innovative startup ecosystem through 2025• Vietnam strategy on ICT development till 2010 and orientations toward 2020
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