**Digital Transformation in Vietnam: Opportunities and Challenges**

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**Abstract**

Digital transformation has been a rapid international trend, which affects several fields and the relations in the global economy. Digital transformation helps to improve productivity, utilize resources and create the opportunity for countries and enterprises to increase their competitiveness. Together with the fourth industrial revolution, “digital transformation” is the popular keyword among policy-makers, scientists and enterprises. Countries, organizations and enterprises have become more aware of the benefits of digital transformation and formulate the solutions to implement digital transformation successfully.

This article analyzes the reality of digital transformation and the strategic objectives of digital transformation in Vietnam so as to identify the opportunities, challenges and solutions to accelerate digital transformation in Vietnam in the coming time.

**Keywords:** digital transformation, information technology, government, enterprise, Vietnam

**1. Understanding digital transformation**

Born in the internet explosion, the concept of digital transformation has become more and more popular to describe the application of digital technology into all the activities of the state and enterprises. It is the pivotal issue of the organizations, especially the enterprises in the context of the fourth industrial revolution.

There has been different understanding of digital transformation. According to Gartner, digital transformation is the application of digital technology to transform the business model, creating new opportunities, revenues and values[[1]](#footnote-1). Microsoft proposes that digital transformation is rethinking the method of behaviors, activities, data and processes to create new values[[2]](#footnote-2).

In Vietnam, the digital transformation is understood as the process of changing from traditional model to digital enterprise by applying new technology such as big data, Internet of things, cloud computing, etc. to change the method of leadership, management, work process and organizational culture[[3]](#footnote-3).

Digital transformation has the effect not only on organizations and enterprises but also other stakeholders such as customers, partners, human resources and distribution channels, etc. With comprehensive influence on social life, digital transformation is misunderstood with other concepts such as digitization and digitalization.

Based on the above discussion, digital transformation can be defined as the process people change the method of production, life style and working style with digital technology.

The essence of digital transformation is to change from traditional to digital living and working style with the digital versions of the entity and their connection in the digital space. The digital transformation is taking place on three different levels: (1) digitization: digitization is to transform the entity (objects, things) from analog to digital form, that is to create the digital version of the entity such as to digitize printed documents to produce electronic files; (2) Digitalization is to find the living and working style based on digital technology and digitized data. It is for organizations and enterprises to identify their operation model or business model; (3) Digital transformation is when individuals and organizations initiate the change toward their intended model[[4]](#footnote-4). This is an intensive and comprehensive change from the top leaders to the members of the organizations from improving digital capacity to culture, making the roadmap and plan, gradually initiating the change as planned.

**2. The importance and reality of digital transformation in Vietnam**

Cutting operation costs, approaching more customers in the long term, making fast and precise decisions thanks to transparent reporting mechanism, maximizing the productivity of the staff, etc. are the most visible benefits of digital transformation for organizations and enterprises. These benefits help to increase the efficiency and competitiveness of the organizations and enterprises.

For individual, digital transformation changes the way that people live, work and interact with one another. Nowadays, the rapid development of new digital technology has influenced all the aspects of human life. Using new technology, each individual can easily organize their working, entertaining and living agenda, find products with reasonable price, join new social networks, obtain better educational opportunities and reduce manual work because the working trend has changed.

For a country, digital transformation creates more new jobs, utilize the resources and natural assets, increase exports and improve services in healthcare and transportation, etc. The effects on individuals, enterprises, organizations and society created a mutual push for development and people will use digital technology more often, enhance their digital skills and the enterprises will have the access to the human resources, which are more skillful. If the enterprises and organizations are better prepared for the competition, create new jobs and reserve the existing jobs, they will contribute the benefits to individual and their country. Digital transformation brings about several benefits such as cutting down the operation costs, approaching more customers in the long term, making fast and precise decisions thanks to the transparent reporting mechanism, therefore, the efficiency and competitiveness of organizations and enterprises are further elevated.

According to a research in 2017 by Microsoft in the Asia-Pacific, the influence of digital transformation on GDP increase in 2017 is about 6 percent, 25 percent in 2019 and expectedly 60 percent in 2021[[5]](#footnote-5). Digital transformation has also increased the productivity by 15 percent in 2015, expectedly 21 percent in 2020; 85 percent of jobs in the region will be transformed in the next three years.[[6]](#footnote-6) McKensey pointed out that in 2025, the influence of digital transformation on American GDP is about 25 percent and about 36 percent for European countries[[7]](#footnote-7).

In Vietnam in recent years, digital transformation has taken place, especially in finance, transportation and tourism, etc. The central government and local governments has been actively working on eGovernment as the prior step towards digital government. Several cities have the plan to built smart city with new technology. However, Vietnamese enterprises, especially small and medium ones are still “confused” with digital transformation.

In the newly approved National Program for Digital Transformation, the Prime Minister identified 6 ideas to the Program, including: Understanding plays pivotal role in digital transformation; Citizens are at the center of digital transformation; Institution and technology are the driving forces of digital transformation; Developing digital foundation is the breakthrough solution to accelerate digital transformation with less costs and more effectiveness; Ensuring cyberspace security and safety is the key to successful and sustainable digital transformation and is an indispensable part of digital transformation; and the participation of the whole political system, synchronous action of central and local governments and the participation of the people are the factors for successful digital transformation[[8]](#footnote-8).

However, state organizations and enterprises, especially small and medium ones in Vietnam are not yet fully aware of the role of digital transformation. According to Vietnam’s Chamber of Commerce and Industry, Vietnam’s small and medium enterprises account for about 97 percent of the enterprises; the level of science, technology and innovation is low with 80 to 90 percent of machines in Vietnam’s enterprises are imported overseas and about 80 percent of technology is dated to 1980-1990[[9]](#footnote-9). In April, Cisco released the report “Digital readiness of small and medium enterprises in Asia-Pacific” conducted with 1.340 enterprises in the region and 50 enterprises in Vietnam. In Vietnam, small and medium enterprises are facing with barriers in digital transformation such as the inadequacy of digital skills and human resources (17 percent), weak information technology infrastructure for digital transformation (16,7 percent), lack of digital skills or digital culture in the enterprises (15,7 percent), etc. However, the report also pointed out that Vietnam’s small and medium enterprises started to invest in cloud computing (18 percent), cyber security (12,7 percent), upgrade the software and hardware for digital transformation (10,7 percent)[[10]](#footnote-10).

Information and communication technology has been extensively applied in different enterprises, helping to increase productivity and competitiveness. However, the majority of Vietnam’s enterprises, especially small and medium enterprises are not proactive in approaching technology, infrastructure and changing the business model to catch up with technology[[11]](#footnote-11).

Information and communication technology has been utilized broadly in social development, improving the life quality of the people, reducing social gap, especially in education and healthcare. However, there are still some shortcomings, for example, the inequality in the opportunity for education and healthcare services keeps increasing; the quality of the service is not consistent; access to financial services is troublesome, etc.

For the operation of state organizations, information and communication technology has been applied to develop eGovernment, improving public administration. However, the number of online transactions (at level 3, 4) is small; the online moderation is limited; national database is slowly developed; the connection and share of data among state organizations are limited; the application of modern digital technology in state organizations to change the working model and method has not been popular[[12]](#footnote-12).

In general, the application and development of information and communication technology in Vietnam have been started in several fields. However, the application and development of information and communication technology are not ready for digital transformation, that is, it has not created the breakthrough in the model, process and product based on digital data and technology[[13]](#footnote-13).

**3. Implications of digital transformation with state governance and corruption prevention**

Digital transformation improves the transparency, integrity, accountability and effectiveness of state governance. Digital transformation also helps to reform public administration from traditional model to eGovernment by providing online public services and eliminating the contact and opportunity for corruption by the public officials. It helps the Government to enhance the performance of officials, public administrators, improve public services, reduce the congestion and provide better services to the people.

The construction of eGovernment is closely connected to the responsibility of the leaders, promoting the application of information technology in administrative reform and ensuring the efficiency in state management. Vietnam established the National Council for eGovernment headed by the Prime Minister, who give direct instructions. Members of the Council include Deputy Prime Minister and ministers of relevant ministries, who are directly involved with constructing eGovernment and representatives from private sector in order to strengthen the effective public-private cooperation in this effort. The Government has taken bold steps in recent years, paying attention to applying information technology into the operation of state organizations and considering it as the driving force for the industrialization and modernization of the country. Digital transformation uses data and digital technology to change the experience of the users of public services provided by the State. The change of the technology leads to the change of expertise, model and method of operation by state organizations. National digital transformation is taking place from the government to the society and enterprises to develop the digital economy and construct the digital society. Some fundamental databases such as National database of enterprise registration, National database of insurance, National database of population, National database of land are the main components of the system. Based on such system, state organizations provide essential public services to enterprises and citizens such as enterprise registration, tax declaration and payment, electronic customs, social insurance, etc. At central level, the transactions are processed on online environment. At local level, the one-door electronic information system is operated, increasing the accountability and responsibility of the public servants.

The recent implementation of eGovernment, especially in the prevention and fight against COVID-19 has brought about important systematic changes in the leadership of the Government, Prime Minister to ministries and local governments, resulting in remarkable quality and effectiveness. Vietnam has launched national systems such as tax and customs system, enterprise registration, etc. As for the system for managing documents, which is at the heart of the eGovernment, by December 2019, 30/30 ministries and equivalents and 63/63 provinces and central cities successfully integrated their softwares with Government’s Office, forming a common system for managing documents from central to local organizations, allowing the users to track the status of document processing among these organizations[[14]](#footnote-14). For example, in just one month, the number of services processed online doubled, which is equal to the amount of work in 20 years[[15]](#footnote-15).

As for the publicizing of portfolio status, 63/63 provinces and 19/30 ministries have publicized the status of processing portfolio in Government’s Portal. The Government’s Office publicized the document processing of the leaders of the Government’s Office and the leaders of Government. Out of 83 required online public services, 78 have been provided at 20 ministries and 32/63 localities have offered 44 online public services as required[[16]](#footnote-16).

In Vietnam, models of digital transformation create helpful services to the people and utilize redundant resources effectively. However, they also created contradiction by changing the traditional business model fundamentally. The advantage of new technology is empowering startups in traditional fields such as Uber and Grab is providing transportation services to the passengers.

**4. Strategy and objective of digital transformation in Vietnam**

The world is at the start of the fourth industrial revolution. The revolution is in exponential speed and it is based on the digital revolution with the combination of many technologies, leading to unprecedented changes in social and economic model. It requires the transformation of the whole system of countries, enterprises, industries and societies. Like other revolutions, we have to accept alternatives, even eliminate the old-fashioned and outdated things to nurture new foundation, which is in line with the development and evolution. In order to successfully realize the fourth industrial revolution, it is important for countries to start “digital transformation”.

On 3rd June 2020, the Prime Minister of Vietnam passed decision numbered 749 to approve the “National Program for Digital Transformation toward 2025 with vision to 2030”. The program envisioned that by 2030, Vietnam becomes a digital stable and prosperous country, who pioneers in new technology and model; implements fundamental and comprehensive innovation in the leadership and management of the Government, production of the enterprises, life and work of the people and develops safe, human and inclusive digital environment.

The National Program for Digital Transformation has dual objectives, which are to construct digital Government, digital economy, digital society and to develop Vietnam’s enterprises of digital technology, who can reach the global market with a set of basic criteria. This program identified two set of objectives as follows:

*Fundamental objectives towards 2025*

The fundamental objectives towards 2025 about the construction of digital Government and the increase of its efficiency and effectiveness include the following criteria: 80 percent of public services at level 4 are offered on different media, including mobile media; 90 percent of transactions at the ministries and provinces, 80 percent of transactions at districts and 60 percent of transactions at communes are processed online (with exception to transactions of national secret); 100 percent of reports, regular reports and statistical reports about the social and economic situation for the direction and leadership of the Government, the Prime Minister are connected, integrated and shared in the Government’s Report System; 100 percent of national database serves as the foundation for eGovernment, including national database about population, land, enterprise registration, finance and insurance to be completed, connected and shared across the country; gradually open the database of state organizations to offer public services quickly with one-time registration and life-time service for the people and social, economic development; 50 percent of examination by state authorities are done via digital environment and information system of the authorities; and Vietnam will be in the top 70 countries with eGovernment (EGDI)[[17]](#footnote-17).

About the development of digital economy and increase of competitiveness of the economy, the objectives towards 2025 are to develop the digital economy to account for 20 percent of GDP; the ratio of digital economy in each of the industries and sectors will be at least 10 percent; the productivity will increase at least 7 percent a year[[18]](#footnote-18).

The program also aims to bring Vietnam to the top 50 countries in information technology (IDI), top 50 countries in competitive index (GCI) and top 35 countries in innovative creativity (GII)[[19]](#footnote-19).

About developing digital society, narrowing the digital gap, the objectives towards 2025 include: the fiber broadband infrastructure will reach over 80 percent of households, 100 percent of communes; popularization of 4G/5G network and smartphone; more than 50 percent of the population have electronic accounts and Vietnam joins the top 40 countries in cyberspace security and safety (GCI)[[20]](#footnote-20).

*Fundamental objectives towards 2030:*

100 percent of online public services at level 4 are offered on different media, including mobile devices. 100 percent of transactions at ministries, provinces; 90 percent of transaction at districts and 70 percent of transaction at communes are processed online (with exception to transaction of national secret)[[21]](#footnote-21). In addition, Vietnam aims to reach the top 50 countries in eGovernment (EGDI)[[22]](#footnote-22).

About developing digital society, narrowing the digital gap, the objectives towards 2030 include: popularization of fiber broadband infrastructure; popularization of 5G network and smartphone; more than 80 percent of the population have electronic accounts[[23]](#footnote-23) and Vietnam joins the top 30 countries in cyberspace security and safety (GCI)[[24]](#footnote-24)

Decision 749 specified that the tasks and solutions to create the foundation for digital transformation include changing the understanding; constructing the institution; developing digital infrastructure and foundation; establishing trust, ensuring online safety and security; advancing international cooperation, research, development and innovative creativity in digital environment[[25]](#footnote-25).

To develop the digital government, it is necessary to develop the digital government infrastructure for state organizations by combining the advantage of specialized network for data transmission, internet, database center to facilitate smooth connection through the 3 administrative levels[[26]](#footnote-26).

It is also important to actively implement resolutions, programs, plans, projects of eGovernment, to construct national database portal; to apply the newest technology in social media, provide information, public services in simple and convenient way in mobile platforms; to develop and improve the National public service portal connected to Public service portal[[27]](#footnote-27)…

**5. Advantages, difficulties and solutions to foster digital transformation in Vietnam**

***5.1. Advantages***

According to the Minister of Information and Communication Nguyen Manh Hung, “Digital transformation brings about huge opportunities for Vietnam. This is the comprehensive change of organizations and enterprises. Information technology enterprises are at the core of digital transformation in Vietnam. The digital transformation does not require much infrastructure because changing the way of thinking is the most needed thing”[[28]](#footnote-28).

By the end of 2018, about 70 percent of Vietnamese people got the access to internet. According to Miniwatts Marketing, Vietnam ranked 13th in the top 20 countries with highest internet penetration in the population[[29]](#footnote-29). Vietnam ranked 25th out of 39 countries in the research sample with regards to people’s ownership of smartphones and ranked the first in Southeast Asia[[30]](#footnote-30). Vietnam is also a country with the biggest increase in the number of smartphone users in the world with the increase of about 18 percent (in the period from 2015-2019)[[31]](#footnote-31).

Digital transformation is an irreversible global trend and this is the opportunity for Vietnam to realize the ambition to be a powerful country. The digital economy of Vietnam has developed rapidly thanks to the adequate infrastructure of information technology and telecommunications with wide coverage and numerous users. This is because Vietnamese people are passionate and keen on using technology and the country has an young population, which is properly trained, study mathematics well, work industriously and Vietnamese people are also adaptive to changes. These are the advantages for Vietnam to start digital transformation under the leadership of the Government with the National Strategy for Digital Transformation and Digital Economy.

According to research reports, Vietnam can promote the GDP with an increase of 28.5 to 62.5 billion USD, which is equivalent to 7 to 16 percent increase of GDP in 2030, depending on each scenarios (high, medium, average)[[32]](#footnote-32). The per capita will increase from 315 to 640 USD/person by 2030 thanks to the increase of productivity and employment. The increase of production will create new employment with the forecast growth of 1.3 to 3.1 million jobs. While employment in some sectors will decrease, new jobs in other sectors will be created[[33]](#footnote-33).

 According to the report, by 2030, digital technology will be helpful to new industries in Vietnam and will bring about “huge” revenue, for example, eCommerce will reach about 40 billion USD; artificial intelligence will reach 420 million USD; cloud computing will reach 2.2 billion USD; technological transportation will reach about 2.2 billion USD; smart agriculture about 1.7 billion USD and Fintech about 1.5 billion USD[[34]](#footnote-34)...

***5.2. Difficulties***

Vietnam is a developing country with middle income while the legal framework and policy corridor are not fully established and have not played the tectonic role for economic development in the fourth industrial revolution and digital transformation. The technology infrastructure is not synchronous and is not ready for high technology. It is also important to mention that the attention given to research, innovation of technology and creativity, education of human resources is not inadequate and the investment in technology is lower than many other countries in the world.

Digital transformation brings about several challenges and opportunities in all aspects of the social life. The research “Technology and future of employment in ASEAN” conducted by Cisco in collaboration with Oxford Economics predicted that the application of artificial intelligence in software, hardware and robot will bring about important changes in employment landscape of the six biggest economies in ASEAN by 2028; the agriculture sector will expectedly have 6.6 million redundant workers in 2028 mainly because of the lack of information technology skills[[35]](#footnote-35). According to a research by McKinsey, artificial intelligence has huge potential contribution to the world economy and growth, with estimated contribution of about 13 billion USD[[36]](#footnote-36). These factors will meet with more barriers and challenges when labor expenses increase compared to less developed countries in the world. The extensive growth based on scale will face difficulties when Vietnam’s population is getting older as the birth rate is decreasing and Vietnam’s productivity is still low[[37]](#footnote-37).

There is a shortage of human resources for high technology in Vietnam. Education and training have not aligned with international standards and have not met the need for national digital transformation. It is also important to mention the backward, old-fashioned and conservative habits in using technology. The percentage of enterprises and people, who are technology-savvy is still low. The implementation of new directions and policies is not straightforward and consistent.

Speaking at the opening ceremony of the competition Viet Solution 2020, the Minister of Information and Communication Nguyen Manh Hung said, “Vietnam has the advantage for digital transformation as there are many strong telecommunications and information technology enterprises and this is the time for the country to take breakthrough solutions and improve the national ranking”[[38]](#footnote-38). “Digital transformation in the ministries is the focus of national digital transformation. The presence of the leaders of Ministries at the ceremony today is the evidence of commitment for national digital transformation by starting digital transformation in our own ministries. The National Program for Digital Transformation has been issued by the Prime Minister, in which, ministries are required to create their strategy or project to implement digital transformation in their sector”[[39]](#footnote-39).

***5.3. Solutions to accelerate digital transformation in Vietnam***

Digital transformation in Vietnam in the coming time is the inevitable and essential trend. It is important to invest resources, mobilize the determination of all social actors and find out suitable solutions to ensure successful digital transformation.

*Firstly,* to create the foundation for digital transformation, it is important to change the understanding about the mission, necessity, urgency of digital transformation in the society and extend the understanding from small to larger group, from an organization, an individual to the community with convincing success stories. Resolution numbered 52-NQ/TW dated 27th September 2019 by the Politburo pointed out that “The participation of our country in the fourth industrial revolution is still unassertive. There are several limitations and shortcomings in the institution and policy. The structure and quality of the human resources have not met the requirements. The process of national digital transformation is slow and passive because of the inadequate infrastructure” and stated that “it is mainly because of subjective reasons”[[40]](#footnote-40). The main challenge for national digital transformation is our thinking and understanding. If the thinking and understanding of each individual do not change, the digital transformation of the country cannot take place.

To implement this first solution, it is important to make sure that the leaders are directly responsible for digital transformation in their organization, field or area; establish and maintain the effective work of the Digital transformation working group to spread the inspiration and take the pioneering role; design the identity kits for the National Program for Digital Transformation; Each locality will choose one commune/ward to pilot the communication project and educate fundamental skills for the people.

*Second,* todevelop digital infrastructure, which is ready for the explosive need for connecting and processing data with the function of monitoring the network to each of the access points and to ensure the cyberspace safety and security right from the stage of design and development.

To realize this solution, it is important to construct and develop broadband infrastructure; upgrade the mobile network 4G and implement 5G, integrate 4G, 5G technology into mobile phones and increase the popularity of smartphones; improve internet access in the country and popularize the domain “.vn”; develop the infrastructure for internet of things and sensors to convert the traditional infrastructure into an important component of the digital infrastructure. The universalization of smartphones to reach one smartphone/person and of broadband infrastructure to ensure one fiber cable/household is essential for accelerating the process of digital transformation.

*Thirdly,* conduct the research to revise, modify and complement legal documents. It is important to construct and improve the legal system, which is suitable with the digital time and safe online environment. The legal regulation can either facilitate or hinder the development of digital transformation. In fact, the establishment of legal framework is slow and has not kept in line with social development, especially in the new fields of digital transformation. For example, there is a shortage of legal framework for developing sharing economy; for sharing and opening the database of the government and enterprises; for protecting personal data, private information and ensuring right and ethics in applying artificial intelligence, etc. Therefore, it is important to revise and complement the legal documents about the technology of information and communication. It is also important to research the policies and regulations about tax, fee to encourage the people and enterprises to use and provide digital services. It is essential to review and revise civilian, criminal legal documents and specialized laws to increase the punishment for cheating and swindling on online environment. Protecting data and online security is one of the big challenges that Vietnam has to face. About 35 percent of internet users in Vietnam face the risks of online attack, the sixth highest in the world[[41]](#footnote-41).

*Fourthly*, enhance the capacity of labor force in information technology. According to the employment website Vietnamworks, by the end of 2018, Vietnam is short of 70.000 workers in the filed of information technology. In 2020, this number will increase to 500.000[[42]](#footnote-42). There is not only the shortage in the number but also in the quality of skillful human resources, who has the expertise and knowledge to meet the need of the changing technology market, leading to the competition among enterprises for talented people.

In summary, digital transformation is a long process with different speed and scale in different countries and fields. The lessons of success and failure in digital transformation pointed out that it is important to have an visionary and comprehensive view, clear plan and roadmap and effectively implement one stage to the next.

**References:**

1. Nguyen Thi Que Anh, Vu Cong Giao, Vu Ngoc Anh, Nguyen Thi Minh Ha (2019), *Open government, eGovernment and modern state management*, Hong Duc Publishing House, Hanoi.

2. Nguyen Tuan Anh (2020), “Accelerating digital transformation in Vietnam”, Journal of Vietnam Science and Technology (online).

3. Ministry of Information and Communication (2020), *Report of strategy for developing information and communication industry in 10 years from 2021 to 2030 and vision towards 2045.*

4. Ho Tu Bao (2020), “Digital transformation in time of Covid-19”, Tia Sang magazine, accessed on 20/4/2020, https://tiasang.com.vn/khoa-hoc-cong-nghe/Chuyen-doi-so-thoi-Covid19-23135

5. Nguyen Thi Phuong Dung (2020), “Digital transformation and the effect of digital transformation in the current context”, at http://www.tapchicongthuong.vn/bai-viet/chuyen-doi-so-va-tac-dong-cua-chuyen-doi-so-trong-giai-doan-hien-nay-72075.htm; accessed on 01/06/2020 at 10:30 (GMT).

6. Tran Thi Hang, Nguyen Thi Minh Hien (2019), “State management in digital economy”, Journal of Political Theory, issue 6 -2019, p.15-23.

7. Henriette, E., Feki, M., & Boughzala, I. (2015). *The Shape of Digital Transformation: A Systematic Literature Review.*Ninth Mediterranean Conference on Information Systems (MCIS).

8. Majchrzak, Ann; Markus, M. Lynne; and Wareham, Jonathan D. (2016). Designing for Digital Transformation: Lessons for Information Systems Research from the Study of ICT and Societal Challenges. *MIS Quarterl*, 40(2), pp.267-277.

9. Misa (2019), What is digital transformation? Why enterprises need to transform digitally*?,* accessed on 26/4/2020, https://www.amis.vn/tin-tuc/newsid/5577/chuyen-doi-so-la-gi-vi-sao-doanh-nghiep-can-chuyen-doi-so/

10. Prime Minister (2020), *Decision numbered 749/QĐ-TTg by the Prime Minister to approve "National Program for Digital Transformation to 2025, with the vision to 2030”* on 03/6/2020*.*

11. T.Thuy (2019), What is digital transformation and how important is it in the current time*?*, accessed on 20/4/2020, https://dantri.com.vn/suc-manh-so/chuyen-doi-so-la-gi-va-quan-trong-nhu-the-nao-trong-thoi-dai-ngay-nay-20190814121247843.htm.

12. Chu Van Ve (2019), “Digital transformation: Context and challenges”, Banking Journal*,* theme *Banking reality,*issue 4/2019.

1. https://consulting.ocd.vn/chuyen-doi-so-la-gi-ban-chat/ [↑](#footnote-ref-1)
2. Id. 1. [↑](#footnote-ref-2)
3. https://dantri.com.vn/suc-manh-so/chuyen-doi-so-la-gi-va-quan-trong-nhu-the-nao-trong-thoi-dai-ngay-nay-20190814121247843.htm [↑](#footnote-ref-3)
4. http://ictvietnam.vn/chuyen-doi-so-va-cac-khai-niem-lien-quan-20200428154814954 [↑](#footnote-ref-4)
5. https://vnexpress.net/chuyen-doi-so-la-gi-3921707.html [↑](#footnote-ref-5)
6. Id. 5. [↑](#footnote-ref-6)
7. Id. 5. [↑](#footnote-ref-7)
8. Decision numbered 749/QĐ-TTg by the Prime Minister to approve "Program for National Digital Transformation to 2025 with a vision to 2030” on 3rd June 2020. [↑](#footnote-ref-8)
9. Id 5. [↑](#footnote-ref-9)
10. Id 5. [↑](#footnote-ref-10)
11. http://tapchitaichinh.vn/tai-chinh-kinh-doanh/giai-phap-cho-doanh-nghiep-viet-nam-trong-cuoc-cach-mang-cong-nghiep-40-302110.html. [↑](#footnote-ref-11)
12. Nguyen Tuan Anh (2020), “Accelerating digital transformation in Vietnam”, Journal of Vietnam Science and Technology (online) [↑](#footnote-ref-12)
13. https://vjst.vn/vn/tin-tuc/3302/thuc-day-chuyen-doi-so-tai-viet-nam.aspx [↑](#footnote-ref-13)
14. egov.chinhphu.vn,“Developing eGovernment in the context of the fourth industrial revolution”. [↑](#footnote-ref-14)
15. http://baochinhphu.vn/Hoat-dong-Bo-nganh/Se-quyet-nhanh-mot-so-chinh-sach-thuc-day-chuyen-doi-so/390288.vgp [↑](#footnote-ref-15)
16. Id. 14. [↑](#footnote-ref-16)
17. Id. 8. [↑](#footnote-ref-17)
18. 18- 25  Id. 8. [↑](#footnote-ref-18)
19. [↑](#footnote-ref-19)
20. [↑](#footnote-ref-20)
21. [↑](#footnote-ref-21)
22. [↑](#footnote-ref-22)
23. [↑](#footnote-ref-23)
24. [↑](#footnote-ref-24)
25. [↑](#footnote-ref-25)
26. Id. 8. [↑](#footnote-ref-26)
27. Id. 8. [↑](#footnote-ref-27)
28. https://www.qdnd.vn/khoa-hoc-cong-nghe/trong-nuoc/chuyen-doi-so-mo-ra-co-hoi-lon-cho-viet-nam-599725 [↑](#footnote-ref-28)
29. https://baotintuc.vn/khoa-hoc-cong-nghe/chuyen-doi-so-bai-1-co-hoi-va-thach-thuc-20190921124801894.htm [↑](#footnote-ref-29)
30. Id 29. [↑](#footnote-ref-30)
31. Id 29. [↑](#footnote-ref-31)
32. Retrieved from tapchinganhang.gov.vn/chuyen-doi-so-boi-canh-va-thach-thuc.htm.. [↑](#footnote-ref-32)
33. Id 32. [↑](#footnote-ref-33)
34. Id 32. [↑](#footnote-ref-34)
35. Id. 32. [↑](#footnote-ref-35)
36. Id. 32. [↑](#footnote-ref-36)
37. According to the number of the Statistical Administration, compared to other countries in the region, the productivity of 1 Malaysian worker is equal to that of 6 Vietnamese workers, 1 Thai workers is equivalent to 3 Vietnamese workers. [↑](#footnote-ref-37)
38. https://vietnamnet.vn/vn/thong-tin-truyen-thong/tim-giai-phap-chuyen-doi-so-de-viet-nam-phat-trien-thinh-vuong-656199.html [↑](#footnote-ref-38)
39. Id. 32. [↑](#footnote-ref-39)
40. Resolution numbered 52-NQ/TW dated 27/9/2019 by the Politburo about directions and policies to actively engage in the fourth industrial revolution [↑](#footnote-ref-40)
41. https://english.vov.vn/economy/data-protection-the-main-challenge-for-vietnams-digital-economy-372665.vov. [↑](#footnote-ref-41)
42. https://nld.com.vn/cong-doan/viet-nam-can-78000-nhan-luc-cong-nghe-thong-tin-moi-nam-20180610062209763.htm. [↑](#footnote-ref-42)