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THE DIGITAL ECONOMIC ECOSYSTEM IN VIETNAM

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Abstract

Since the early 2000s, digitalization and the digital economy have developed rapidly and rapidly changed all aspects of social life. Digital platform ecosystems in Vietnam are still in their early stages of development, but they are growing rapidly. These digital platforms are playing an increasingly important role in the Vietnamese economy. They are driving innovation, economic growth, and job creation. This article will analyze some of the current development status of the digital economic ecosystem in Vietnam: the advantages as well as the difficulties and challenges that Vietnam will face. The article will provide some policy suggestions for Vietnam in developing the digital economic ecosystem from these analyses.

Keywords: Digital Economy, Vietnam, Digitalization, Economic Ecosystem

Introduction

The emergence of Industry 4.0 with the digitalization trend or digital transformation is appearing strongly in all fields. The focus of Industrial Revolution 4.0 is digital transformation, integration of digitalization, connectivity or hyper-connectivity, and intelligent data processing. Digital technology is applied in all fields and economic sectors,

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from smart agriculture to digital services, from production to distribution and circulation of goods to support infrastructure such as transportation, logistics, finance, and banking. In Vietnam, at the "Vietnam Economic Forum 2019", digital economy is understood as all economic activities based on digital platforms, and digital economic development is the use of digital technology and data materials to create new business models.

Since the early 2000s, digitalization and the digital economy have developed rapidly and rapidly changed all aspects of social life. On the one hand, the digital economy is an economic sector that contributes significantly to the total national income of many countries with different estimates (about 8% of GDP, about 33% of GDP, or about 87% of GDP) (Ravikumar, n.d.). On the other hand, the digital economy creates diverse and constantly improving business types while creating new jobs, attracting many labor sources in society. Furthermore, the digital economy provides additional value for consumers and society, enriching people's spiritual lives. The digital economy has become an inevitable trend for every country worldwide. The rapid development and widespread application of the Internet of Things in business, leading to the formation and high-speed development of related economic activities, has led to diverse and abundant business definitions. In Vietnam, the digital transformation process is taking place systematically and selectively and is initially forming elements of the digital economic ecosystem. Therefore, based on a theoretical overview of the digital economy and digital transformation, this study will analyze and evaluate the current situation of the digital ecosystem in Vietnam and, from there, make some recommendations for solutions for Vietnam in the process of perfecting the digital economic ecosystem.

Literature Review

Bukht and Heeks (2017) summarize 21 typical definitions of the digital economy, stating that the first definition appeared in 1999, and there are increasingly new definitions. The author finds that the definitions of the digital economy include the Information and Communications Technology economy (ICT sector) along with a category of ICT consumption/application; this category differentiates the definitions. From there, the two factors proposed a conceptual framework of a three-scope digital economy: Core Digital Economy, narrow-scope digital economy, and wide-range digital economy (Digitalized Economy, or digital economy). In 2019, the OECD proposed a digital economy

measurement toolkit to help G20 members track and highlight critical gaps and challenges in digital transformation. The digital economy measurement toolkit looks at 35 economic metrics across four thematic groups: infrastructure, social empowerment, technology innovation and adoption, jobs and growth.

Parker and Van Alstyne (2017) argue that digital platforms and ecosystems are creating a new paradigm for business. In this new paradigm, businesses must focus on creating value for the entire ecosystem rather than just themselves. They also argue that digital platforms and ecosystems are leading to a new form of competition, which they call "ecosystem competition." Ecosystem competition is a competition between platforms to attract and retain the most valuable users and complements. Hein et al. (2020) defines digital platform ecosystems as "complex networks of interconnected actors who interact and collaborate to create and deliver value through a digital platform." They identify four key characteristics of digital platform ecosystems: Heterogeneity, Interconnectedness, Co-evolution, and Digital platform. He has provided a number of examples of successful digital platform ecosystems, including the Apple App Store, the Amazon Marketplace, and the Google Play Store. These ecosystems have transformed the way businesses operate and compete, and they continue to play a growing role in the global economy. The research by Hein et al. (2019) has a number of implications for businesses and policymakers. Businesses need to develop strategies for participating in and benefiting from digital platform ecosystems. Policymakers need to create an environment that is conducive to the growth and development of digital platform ecosystems.

Previous studies have introduced digital technology and factors that affect it, such as laws and policies, but have yet to analyze or give a clear concept of the digital ecosystem. The digital ecosystem will change based on technology, policy, and law changes. Technological change is an internal change in the digital ecosystem, while the impact of policy or law is an external factor that creates the operating environment of the ecosystem (Jacobides et al., 2019). Thus, the digital ecosystem includes digital technology platforms, policies, and laws. Digital technology platforms include social networks, search engines, AI, IoT, big data, and adaptive technologies in each field... Policy and law is the country's legal system—economic or national, specific policies affecting digital transformation and the digital economy(Karpunina et al., 2020). While businesses use technology to increase competitiveness, policies and laws affect people and society (Bessonova et al., 2022). Technological infrastructure plays an important role in developing a country or company's

digital ecosystem, such as the Internet, mobile networks, internal connections, and investing in building data and technology platforms. Innovative technology will be a breakthrough in digital transformation in general and the digital ecosystem in particular.

Current Status of the Digital Economic Ecosystem in Vietnam

To evaluate the current state of the digital economic ecosystem in Vietnam, we can determine according to infrastructure, regional characteristics, innovation and technology application, digital transformation orientation, and network security.

The Infrastructure

Infrastructure is a factor related to the development of physical infrastructure and security services in the digital economy, including investment in broadband, increase in mobile broadband, moving towards higher internet speeds, connection prices, infrastructure for the Internet of Things, Secure server infrastructure, household computer access, household Internet access.

Previously, telecommunications infrastructure was only physical infrastructure (complex infrastructure is a collection of telecommunications equipment, transmission lines, telecommunications networks, and telecommunications works) serving the provision of telecommunications services (sending, transmitting, receiving, and processing information between two or a group of people). Digital infrastructure is now essential to connect, create, and maintain the data flow of the digital economy and society digital infrastructure, including physical infrastructure (broadband telecommunications infrastructure, data centers) and soft infrastructure (cloud computing, IoT connection) with high-speed broadband to meet all needs of the digital economy and digital society. Therefore, the content of digital infrastructure will include:

(1) Broadband telecommunications infrastructure to transmit and process voice and messages at kbps and mbps speeds. Currently, Vietnam is investing in broadband telecommunications infrastructure to ensure the provision of all types of services at Gbps and Tbps.

(2) Cloud computing infrastructure. A service model that allows people to access shared computing resources (network, server, storage, applications, services) through a network connection easily, anytime, anywhere, on demand.

(3) Internet of Things connection infrastructure. The Internet of Things (IoT) has become ubiquitous in which people, processes, data, and things connect to the Internet and each other. Currently, globally, IoT connections reach nearly 26-30 billion devices (an average of 4 devices/person: each person has two handheld devices (mobile, computer, or watch), one vehicle, and one household appliance).

Regarding broadband telecommunications infrastructure, the need to develop high-quality broadband telecommunications infrastructure has been established as an indispensable condition in Vietnam. Vietnam has become one of the countries with the fastest Internet development and application rates globally, with over 70% of the population connected to the Internet. Vietnam's telecommunications infrastructure has achieved many important targets, such as:

- The mobile broadband network is developed, the proportion of the population covered by 4G reaches 99.8%. Number of mobile broadband subscribers/100 people: 90%.

- Fiber optic cable covers the whole country to 100% of communes. The number of fixed broadband subscribers reached over 18 million (mainly using FTTH fiber optic cables), growing 15%/year; over 68% of households have FTTH connections.

- 06 undersea fiber optic cable lines, three land fiber optic cable lines connecting to countries in the region such as Laos, Cambodia, and China.

- Regarding mobile broadband speed, Vietnam ranks 56th globally with a rate of 33.9Mbps.

For cloud computing infrastructure: currently, in Vietnam, there are three groups of cloud computing infrastructure providers, including foreign businesses (Google, Microsoft...), Large-scale domestic enterprises with synchronous investment (Viettel, VNPT, CMC, FPT), and a group of small companies providing applications or services.

According to reports by ResearchMarket and TechSCI, Vietnam's cloud computing market at the end of 2020 reached about 200 million USD (4,600 billion VND). However, Vietnamese businesses only account for about 20% of domestic cloud computing products and services (equivalent to more than 900 billion VND); foreign suppliers provide 80% of the market share. (Google, AWS, Microsoft Azure, etc.).

With the population size in Vietnam and the data growth trajectory of the e-government transformation process towards digital government, developing the digital economy and digital society requires the strong development of Data Centers that meet the country's

increasing data storage, calculation, and processing requirements. Vietnam's Data Center market has seen tremendous growth over the past decade, based on the data explosion through smartphones, social networking sites, e-commerce, digital entertainment, education numbers, digital payments, and many other digital services. Data growth is further stimulated by adopting new technologies such as High-Performance Computing, Artificial Intelligence (AI), and Internet of Things (IoT).

For Internet of Things Connection Infrastructure

Along with the explosion of emerging technologies, Vietnamese people are now actively using mobile phones to communicate between devices and people for purposes such as data transmission. Images through the regular mobile packages that the network provides customers lead to the network needing to be fully managed according to the customer's intended use.

Vietnam has good telecommunications infrastructure and strong telecommunications businesses capable of investing in advance in IoT infrastructure for nationwide coverage and planning enough numbers and IP addresses for billions of IoT devices from there. IoT infrastructure will be a potential market and will create explosive growth shortly.

With an estimated 2.5-3 IoT devices/person, by 2025, IoT connections in Vietnam will reach about 250-300 million connections. By 2030, when the 5G network is nationwide, this number will be up to 800 million devices.

Social Empowerment

Social empowerment is one of the factors evaluating the development of the digital economy in people's lives (Roberts et al., 2015). The change in people's awareness of accessing and using digital technology and the ability to fully exploit it to their potential include indicators: Digital native, narrowing the digital gap, Internet Users, Consumer electronics, Mobile-based money accounts, C2G (citizen-government) interaction, Education in the digital age, Personal ICT skills.

Awareness plays a decisive role in the digital economy. Digital transformation helps people have equal access to services, training, and knowledge. Thereby helping to narrow the digital gap through the development of digital government, digital economy, and digital society. To raise awareness about the digital economy, many provinces and cities across the country have directed localities to establish and deploy activities of community digital

technology groups in each neighborhood, village, and hamlet for propaganda. So, people are clearly and correctly aware of digital transformation, and at the same time, digital technology is quickly spreading to all aspects of life and each person.

The business owner's awareness of digital transformation is essential for successful digital transformation. They are the ones who "lead" the business to digital transformation in the right direction. Besides, the awareness of workers also needs to change. Everyone must realize their role and responsibility in the digital transformation process. Employees must be aware that they need to change or proactively improve their qualifications, expertise, and skills and access new technology to do their jobs, directly affecting their operations, business activities, and income to work harder and be more responsible at work.

The human factor is decisive to carry out digital transformation successfully. Vietnamese people are hard-working, willing to serve the country, and respectful of the military. They are also courageous, diligent, and determined to work. In cultural acculturation, besides the reserved aspects, Vietnamese people also quickly absorb many advantages in the cultures of different regions and quickly adapt to new technological trends. This is one of the essential premises to help Vietnam transition to a digital economy.

The development of IT human resources is regularly paid attention to, focusing on training and fostering civil servants at the provincial and district levels. The teaching and learning of information technology in universities, colleges, and educational and training establishments has developed positively. The human resources of many provinces and cities across the country today: 100% of officials, civil servants, and public employees are trained in information technology and IT applications to serve professional work. The rate of officials, civil servants, and public employees regularly using computers to handle work reached 100%. The rate of officials, civil servants, and public employees periodically utilizing the Internet to take work reached 100%. Percentage of civil servants and public employees of many provinces with IT application certificates according to essential IT use skill standards or higher according to regulations in Circular No. 03/2014/TT-BTTTT, dated March 11, 2014, or applied information technology certificates reaching nearly 100%.

Innovate and Apply Technology

Decision No. 749/QD-TTg, dated June 3, 2020, issued by the Prime Minister approving the "National Digital Transformation Program to 2025, orientation to 2030," aims at the dual goal of developing the Government (Yen et al., 2022). Digital government, digital

economy, and digital society have just formed Vietnamese digital technology enterprises that can go global. Besides, the program also identifies that viewpoint awareness plays a decisive role in digital transformation. People are at the heart of digital transformation; Institutions and technology are the driving forces of digital conversion; Digital platform development is a breakthrough solution to promote faster digital transformation, reduce costs, and increase efficiency; Ensuring network safety and security is the key to successful and sustainable digital transformation, and is an integral and inseparable part of digital transformation. All equipment, products, software, information systems, and investment projects in information technology have mandatory safety and network security components right from the design. The involvement of the political system as a whole, synchronous action at all levels, and the participation of the entire population ensure the success of digital transformation.

Resolution 50/NQ-CP dated April 17, 2020, of the Government promulgating the Government's Action Program to implement Resolution No. 52-NQ/TW dated September 27, 2019, of the Politburo on several policies, proactive policy to participate in the Fourth Industrial Revolution (Chuc & Anh, 2023). The Government has assigned the Ministry of Information and Communications to "Research, develop and propose mechanisms and policies to encourage private enterprises with sufficient capacity to participate in building telecommunications infrastructure and other infrastructure for transformation and identify solutions: "Urgently review and improve institutions to create a favorable environment to attract and effectively use investment capital sources strongly. Amend and supplement the Land Law, Bidding Law, Investment Law, Public Investment Law, Urban Law, other relevant laws and by-law documents to facilitate infrastructure development.".

Decision No. 749QD-TTg, dated June 3, 2020, of the Prime Minister approving the "National Digital Transformation Program to 2025, orientation to 2030" has identified a vital solution to focus on development. Digital infrastructure is the foundation of digital economic development and digital society.

Some Challenges and Limitations

Digital infrastructure serving Digital Government is essential in the Information and Communications Infrastructure Planning. Components of digital infrastructure serving

digital government are related and impact each other, such as interconnection that must come with data sharing and be guaranteed by law. The challenges include:

(1) The system of legal documents is in the review and completion stage. The Telecommunications Law and its guiding documents have been implemented synchronously and thoughtfully, marking a new development of telecommunications law in our country, especially in the face of the trend of globalization, bringing the telecommunications industry. It has achieved many advances, contributing significantly to the development of the economy and society.

However, with the shift to digital space, the development of the digital economy and digital society. Telecommunications infrastructure is shifting to digital infrastructure; The vigorous development of science and technology opens up new spaces such as Cloud, AI, IoT, Data analysis, and Blockchain; the essential explosive growth of Digital Transformation platforms; As well as the emergence and development of many new business forms in the digital space, new management requirements arise that are not yet covered by the Telecommunications Law. In addition, in Vietnam and other countries worldwide, there is only the concept of "telecommunications infrastructure" and "information technology infrastructure." Still, there is no official mention of "digital infrastructure" nor Evaluation criteria and related promotion solutions.

(2) The state mainly invests in broadband infrastructure. Currently, Vietnam has 70 enterprises providing fixed broadband services, including 17 state-owned enterprises, 01 foreign-invested enterprise, and 52 private enterprises. However, the investment rate of private enterprises in fixed broadband investment is only 7.52%.

(3) Has yet to create business confidence in digital virtualization infrastructure, especially cloud computing infrastructure. Although cloud computing services bring many advantages to small and medium-sized businesses, many businesses still need to understand cloud computing. The rate of state agencies using Cloud services still needs to be higher. The OECD report has shown that the potential for cost savings for governments ranges from 25% to 50% when deploying cloud computing services in information technology investments of state agencies.

Conclusions and Some Recommendations for Solutions to Develop the Digital Economic Ecosystem in Vietnam

Digital economic development has received special attention from the Vietnamese Government. At the macro level, Vietnam has also produced many case study results, such as the Report "The future of Vietnam's digital economy: towards 2030 to 2045" under the Australian Government's Aus4Innovation Program to strengthen links between the innovation matchmaking systems of Australia and Vietnam. The digital economy has become an inevitable development trend of the world, of Vietnam in general and of provinces and cities in particular.

Increase awareness of the digital economy

The digital and knowledge economies have a dialectical relationship and promote each other's development. Advisory agencies are developing a draft, collecting opinions before finalizing it, and submitting it to the Provincial Party Executive Committee for consideration and promulgation this year. Accordingly, the Resolution is expected to set specific goals and solutions to implement digital transformation by 2025 and 2030 in the province's Digital infrastructure, digital government, digital economy, and urban smart.

However, the results only lay the initial foundation for the digital transformation process. Building an e-government towards the digital government, digital economy, and digital society still has many limitations. The information network infrastructure of agencies and units in many provinces and cities still needs to be more robust and consistent, especially in remote communes. People and businesses still need to care about and use public service systems. The rate of level 4 online public services, the rate of online generated records at level 3 and level 4, data integration and sharing platforms and databases... have yet to reach the target.

Improve local government management capacity for the digital economy

The role of government agencies is to manage and lead the economy of each province to implement the economic development strategy successfully. At the same time, as a social entity, local government is also a key participant in the local economy.

In the leading role of local digital economic development, government agencies must perform two important tasks: building a regional digital economic development strategy and digital economic management. A digital economic development strategy must be

carried out according to a modern scientific and efficient approach, most suitable for the locality. Digital economy management policies are tools for successfully organizing digital economic development strategies. Measuring the digital economy and tax policy for the digital economy is a complex issue, so building and implementing digital economy management policies requires a great effort to avoid a familiar concept, simple measurement, and tax policy for the digital economy.

In addition, local governments need to participate in pioneering local digital economic activities. The participation of local authorities is reflected in improving the process of professional training in the digital economy, fostering the professional capacity of "professional expertise" and moral qualities of being "dedicated to serving the people" with local officials is a sustainable activity.

Developing human resources for the digital economy

In the context of Vietnam's low level of economic development, there still needs to be more senior economic experts with enough knowledge and skills in multiple fields (science, technology, economics, and management society) to shape digital economic development. Building a team of digital economy consultants is essential.

Each province and city in the country needs to organize a collaborative group of senior experts in related fields such as science, technology, economics, and management to develop a digital economic development plan for the province, in the medium and long term. Mid-term planning is also one of the premises for building a long-term development strategy.

Improve digital economic capacity for government and business leaders

The critical components of digital economic development are businesses and tiny and medium-sized enterprises. The determination and efforts of self-training on the digital economy of business leaders are decisive in creating motivation to deploy and apply digital economy components. Governments at all levels need to coordinate with businesses to improve digital economy knowledge and skills for business leaders.

IT systems and related high technology in the digital economy often require a certain period to be popularized and effective as designed. Therefore, to shorten the time it takes for technology to be disseminated and absorbed in businesses, investing in training and improving the qualifications of employees and workers in digital economic sectors must be

done. At the same time (if not one step ahead), the investment in deploying and applying IT and high technology in the digital economy. Investment in training in high technology and digital economy for workers needs to increase gradually over time, and activities to improve workers' qualifications need to be identified as a type of labor in the enterprise.

In short, the digital economy has become an inevitable development trend for economies worldwide. The digital economy includes many new and diverse economic types, creating many business opportunities for businesses and employment opportunities for workers. Vietnam has achieved many achievements in transforming towards a digital economy, promoting the advantages of young and potential human resources. These are also essential premises to help Vietnam succeed in transitioning to a digital economy.

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