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Investigate the impact of the digital economy on capital investment management in building telecommunication infrastructure of Vietnam telecommunication groups and corporations

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Abstract

This research aims to evaluate the relationship between the “growth of the digital economy” and the “management of investment capital in building telecommunications infrastructure” of Vietnamese groups and corporations. Using the PLS-SEM method, four hypotheses were tested in this study based on the survey results of 282 officials and experts in telecommunications employed by MobiFone Telecommunications Corporation, The Vietnam Posts and Telecommunications Group (VNPT) -VinaPhone, and Viettel Military Industry and Telecoms Group. According to the study findings, “Digital business,” “Digital business infrastructure,” and “E-commerce” all have a direct impact

on the “Demand for the telecommunications service development” - a mediator variable that plays a crucial role in the growth of telecommunications service; following, it is also found that “Demand for the telecommunications service development” in Vietnam has a direct link with “Investment capital management in building telecommunications infrastructure of telecoms groups and corporations”. The study results are managerial valuable as providing significant implications for the management of investment capital in building telecommunications groups and corporations' infrastructure.

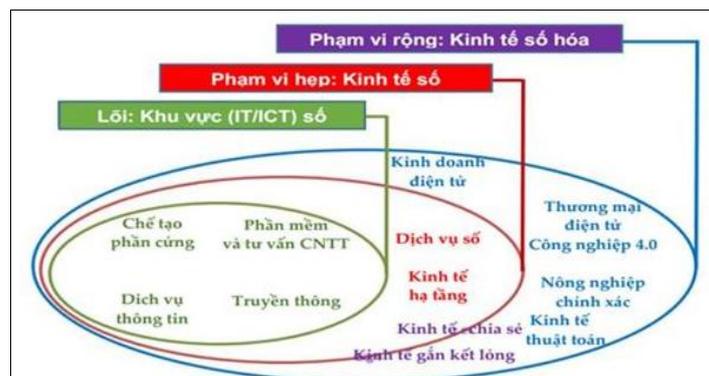
Keywords: Digital Economy, Management of Investment Capital, Telecommunications Infrastructure

1. Literature review

1.1 Digital economy

According to the Oxford Digital Economy Collaboration's definition, a digital economy is an economy that relies predominantly on digital technology, particularly Internet-based electronic transactions. In all, the digital economy comprises all industries and economies that use digital technologies. *There are three key elements of the digital economy namely digital companies, digital business infrastructure, and e-commerce*

Rumana Bukht and Richard Heeks in their paper “Defining, Conceptualising and Measuring the Digital Economy” build the following conceptual framework for the digital economy: ^[5]



Source: ^[5, p. 13]

Fig 1: Conceptual framework for the digital economy

In the Vietnam context, at the Vietnam Private Economic Forum 2019, the digital economy is understood as all economic activities based on a digital platform while digital economic development is the use of digital technology and data to create new business models.

Therefore, it is apparent that the digital economy is an economy that employs digitized knowledge and information to guide and enhance resource allocation and productivity, and promote high-quality economic development. An economy that encompasses the business and management models that develop digital goods and services or support the supply of digital services to governments, corporations, and individuals. Digital economy development is the confluence of several new technologies, such as big data, cloud computing, Internet of Things- IoT, blockchain-Blockchain, Artificial Intelligence AI, and 5G wireless network. New technology enables people to manage large workloads and make more intelligent judgments. This also indicates that big data analysis generates a new level of digital economic development.

The digital economy not only increases scale and growth rates for economies but also alters them in two aspects: (1) production methods (resources, infrastructure, production methods, etc.) and business operation; (2) Economic structure. In which, it is worth noting that besides traditional resources, new development resources appear, which are digital resources and digital wealth. In fact, the digital economy helps to make growth more sustainable, because technology will bring better and more effective solutions to resource use, handling environmental pollution problems, etc.^[3]

The digital economy consists of three primary components: *digital business, digital business infrastructure, and e-commerce*. In which:

- Digital businesses must possess the following four fundamental characteristics: (1) Added value created by digital technology, typically Grab or Uber; (2) Business model characterized by innovation through the application of digital technology; (3) Businesses provide products and services using technology and digital to meet market needs in new manners, leveraging digital technologies to reach potential audiences, sales and delivery are automated; (4) Create a unique value and meet consumer demands that compel customers to pay automatically for digital items or services or products and services that use digital technology.
- When mentioning to digital business infrastructure, economic and social infrastructure, digital connection infrastructure, and connectivity capacity are recalled. To expand the digital economy, it is vital to develop all of the aforementioned domains simultaneously, requiring a synchronized combination of national and commercial resources. At that time, the telecommunications infrastructure will be transformed into ICT (information and communication technology) infrastructure to promote digital transformation, shift the telecommunications industry from voice to data by reducing voice connection fees; popularizing smartphones, planning 5G frequencies, declaring a roadmap to turn off 2G and 3G waves, testing mobile money; addressing data theft, telecommunications garbage problems, etc.
- E-commerce activities refer to the performance of a

portion of the whole process of commercial operations using electronic means linked to the Internet, mobile telecommunications networks, or other open networks. There are four most prevalent e-commerce models presently including B2C (business to consumer), B2B (business to company), C2C (consumer to consumer), C2B (person to consumer), and C2B (consumer to business).

2. Management of Investment Capital in Building Telecommunications Infrastructure of telecommunication groups and corporations

The investment capital management in developing telecommunications infrastructure of telecoms groups and corporations is the use of business financial management system via suitable techniques and instruments to influence the process of distributing and using investment capital to create telecommunications infrastructure with the objective of using investment capital efficiently, contributing to the growth of enterprises in the trend of competition and internationalization.

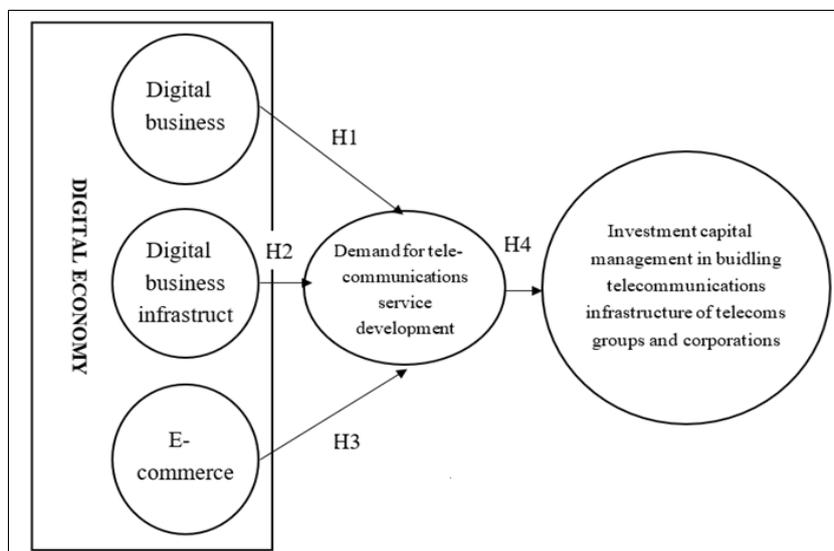
- Capital management entities include companies and telecommunications firms in Vietnam that are currently state-owned. In accordance with the terms of the State-owned Enterprises Law of 2003, the following organizations and people represent the owners of state enterprises: (1) The government directly exercises the rights and responsibilities of state-owned firm owners. The Prime Minister personally implements or allows appropriate ministries to carry out a number of rights and responsibilities of the owner with regard to very significant state-owned firms formed by his decision. (2) State-owned companies without a board of directors are owned by line ministries and provincial-level People's Committees. (3) The Ministry of Finance exercises a number of rights and obligations to represent the owners of state-owned enterprises in accordance with regulations. (4) The Board of Directors is the direct representative of the owner in a state-owned enterprise with the Board of Directors and the owner's representative for the enterprise in which it has invested all its charter capital as prescribed^[4].
- Capital management objects are the entire process of distributing and using capital to invest in building telecommunications infrastructure in support of production and business activities of the Group, the telecommunications corporation. This includes capital planning, investment capital allocation and payment, and investment capital settlement; or management expenses for investment preparation, investment and putting telecommunications infrastructure works into operation; or the objects of management are construction expenses, equipment procurement expenses, and other expenses.
- The purpose of capital management is to ensure that investment capital for the construction of telecommunications infrastructure is used for the right subjects, for the right purposes, in accordance with the plan, economically and effectively, loss and waste reduction, while simultaneously achieving the objective of forming the infrastructure for the production and business activities of the Telecommunication groups and corporations.

- Management tools are mechanisms and policies promulgated by the State by-laws, sub-law documents, planning schemes, planning maps; estimates, design construction drawings; financial and accounting regimes; normative standards; invoices, vouchers and other relevant documents,...

3. Conceptual model and methodology

On the basis of 03 main components in the digital economy

including digital businesses, digital business infrastructure and e-commerce, as well as the assessment that these 03 components do not have a direct impact on the investment capital management in building telecommunications infrastructure of telecommunication groups and corporations (which only have indirect impacts), the author builds the intermediate variable “Demand for the telecommunications service development” and the proposed research model as follows:



Source: Author

Fig 2: Proposed conceptual model

The study put forward several hypotheses as follows:

H1: Digital business has a significant influence on the demand for telecommunications service development.

H2: Digital business infrastructure has a significant influence the demand for telecommunications service development.

H3: E-commerce has a significant influence on the demand for development of telecommunications service.

H4: The demand for development of telecommunications service has a significant influence the investment capital management in building telecommunications infrastructure of telecoms groups and corporations

The primary data used for the study was collected with a total of 350 questionnaires for 350 officials and experts in telecommunications of MobiFone Telecommunications Corporation, The Vietnam Posts and Telecommunications Group (VNPT) -VinaPhone, and Viettel Military Industry

and Telecoms Group from January 2021 to the end of April 2022 through direct survey and Google Forms. The 5-point Likert scale is used (with the ranging from 1 to 5 of Strongly disagree, Disagree, Partially agree, Agree, and Strongly agree respectively). Two hundred and eighty-two valid responses were utilized in the analysis of the data.

Primary data was cleaned and analysed using SPSS and SmartPLS statistical data analysis tools. The investigated factors are coded as follows: Digital business - DB; Digital business infrastructure - DBI; E-commerce - ECOMM; Demand for telecommunications service development- DTSD; Investment capital management in building telecommunications infrastructure of telecommunications groups and corporations -ICM.

4. Results

4.1 Reliability testing of measures items

Table 1: Reliability of measures items

Factor	No of Items	Cronbach's Alpha	Composite reliability	Average variance extracted
Digital business	4	0.781	0.794	0.547
Digital business infrastructure	4	0.813	0.809	0.578
E-commerce	4	0.826	0.811	0.597
Demand for the telecommunications service development	4	0.776	0.789	0.554
Investment capital management in building telecommunications infrastructure of telecoms groups and corporations	4	0.808	0.795	0.569

Source: Primary data analysis results

Table 1 shows that all Cronbach's Alpha coefficients are > 0.7; all composite confidence coefficients are > 0.7; all

average variance extracted (AVE) are > 0.5. Thus, data analysis has ensured reliability.

Table 2: Factor Loading Matrix Analysis

	Factor				
	1	2	3	4	5
DB1	0.883				
DB2	0.838				
DB3	0.776				
DB4	0.747				
DBI1		0.724			
DBI2		0.787			
DBI3		0.813			
DBI4		0.794			
ECOMM1			0.790		
ECOMM2			0.728		
ECOMM3			0.715		
ECOMM4			0.746		
DTSD1				0.860	
DTSD2				0.755	
DTSD3				0.734	
DTSD4				0.709	
ICM1					0.826
ICM2					0.809
ICM3					0.782
ICM4					0.738

Source: Primary data analysis results

Table 2 shows that the factor loading coefficients of the variables are all > 0.7, according to Hoang Trong, Chu Nguyen Mong Ngoc ^[1, 2], these variables all meet the

requirements, or no variables must be removed from the conceptual model.

Table 3: Discriminant value of the scale

	DB	DBI	ECOMM	DTSD	ICM
DB	0.856				
DBI	0.624	0.840			
ECOMM	0.685	0.578	0.790		
DTSD	0.598	0.662	0.548	0.811	
ICM	0.544	0.631	0.607	0.631	0.879

Source: Primary data analysis results

Table 4: Multicollinearity and tolerance testing

	DB		DBI		ECOMM		DTSD		R ²	R ² correction
	VIF	f ²								
DTSD	1.741	0.078	1.736	0.069	1.605	0.073			0.760	0.748
ICM	1.960	0.241	1.912	0.202	1.864	0.137	1.979	0.083	0.792	0.771

Source: Primary data analysis results

Table 3 indicates that other analytical parameters also meet the statistical criteria when the discriminant value of the model is ensured. All values on the diagonal are larger than the ones in the corresponding column.

Table 4 shows: Firstly, the values of variance inflation factor (VIF) are both > 1 and < 5, according to Hoang Trong, Chu Nguyen Mong Ngoc ^[1, 2], this means that there is a moderate correlation between an independent variable, with the other independent variables in the model. However, multicollinearity does not occur.

Second, the coefficient of determination - R² and the adjusted coefficient of determination - R² are quite large (quite close to 1), so it can be said that the built model has a high degree of fit with the dataset used for regression.

Third, the value of the function f² is all > 0.02, showing that all factors have a high degree of influence in the structure, in other words, no factors have to be removed from the model.

Hypothesis testing

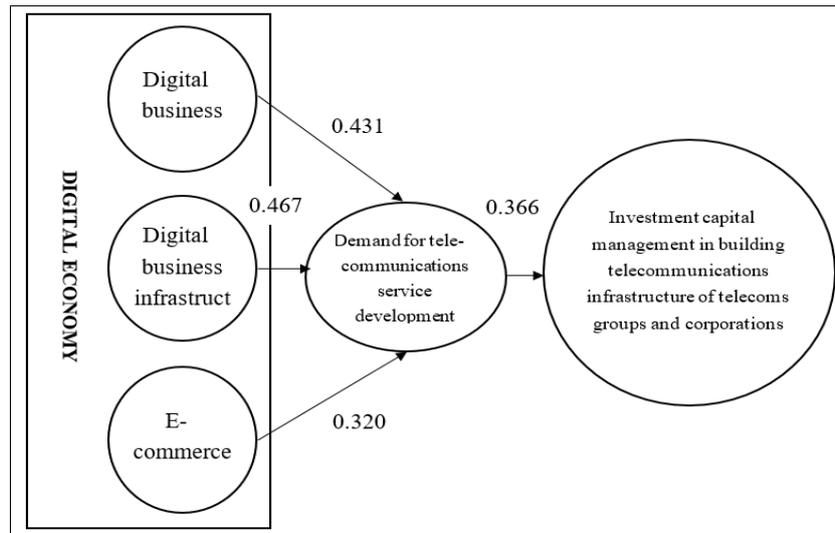
Table 5: Significance level of bind variables (Using Bootstrapping method)

Hypothesis	Original sample	Sample mean	Standard deviation	t- statistics	p-value	Inspection results
H1: BI ---> DTSD	0.431	0.338	0.076	7.578	0.000	Accepted
H2: BIS ---> DTSD	0.467	0.470	0.070	7.940	0.000	Accepted
H3: ECOMM ---> DTSD	0.320	0.323	0.088	6.829	0.000	Accepted
H4: DTSD ---> ICM	0.366	0.364	0.083	7.085	0.003	Accepted

Source: Primary data analysis results

Table 5 shows: First, the probability values (p-value) are all < 0.05, ie the links are significant with 95% confidence.

Second, all hypotheses are accepted.



Source: Primary data analysis results

Fig 3: Analysis results of PLS-SEM model

5. Conclusion and implication

5.1 Conclusion

The results of primary data analysis showed:

The components “Digital business”, “Digital business infrastructure”, and “E-commerce” all have a significant impact on “Demand for telecommunications service development” while “Demand for telecommunications service development” has a significant impact on “investment capital management in building telecommunications infrastructure of telecommunications groups and corporations”.

Thereby, it can be affirmed: that there is a strong link between the “Digital Economy” and the activity of the “Investment capital management in building telecommunications infrastructure of telecommunications groups and corporations” in Vietnam.

5.2 Implication

In all, since it is a new and challenging subject, telecommunications groups and corporations in Vietnam have not paid enough attention to the digital economy elements, especially in the formulating of production and commercial strategies. Consequently, based on the findings of the research, it is suggested that, in the near future, telecommunications groups and corporations need to include digital economy considerations in their production and business strategies including their plan for investment capital in the building of telecommunications infrastructure in general, and the strategy on the use of investment money in the construction of telecommunications infrastructure in particular.

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