Exploring Approaches to Enhance Universal Service in Vietnam

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Do Manh Thai is a PhD fellow at the Centre for Communications, Media and Information Technologies (CMI), Department of Electronic Systems, Aalborg University Copenhagen, Denmark. He has worked for the Vietnam Public Utility Telecommunications Service Fund, Ministry of Information and Communications. His main research focuses on the ways to facilitate the adoption of telecommunications services, especially in rural and mountainous areas in developing countries.

ENGLISH SUMMARY

Broadband networks and the services and applications that they support are increasingly becoming important to each country, and having a considerable impact on the economic growth, the global competitiveness and for its wealth. Hence, many nations in the world have prioritized to develop ICT in general and broadband services in particular. However, the development of ICT has also opened out new digital divides. There is not only the gap between urban and rural areas, but also the gap between the younger and the older generations, and the gap between the higher and the lower income users. Many nations have embarked on deploying universal service programs to close the digital divides.

The thesis aims to analyse universal service policies in Vietnam to explore approaches to reinforce universal service in Vietnam. The thesis based on four papers combined in this thesis to investigate the status quo and point out issues on universal service in Vietnam. By applying different theoretical perspectives that support to explain the Vietnamese circumstance under both social and market perspectives, and additionally a qualitative content analysis, the thesis provides the government with appropriate approaches.

The main findings of the thesis show that, the government should limit intervention into the administrative/regulatory regime and set up contractual relations based on a market regime to provide universal service. Introducing many regulations or intervening much into the administrative regime to deliver universal service means that the government uses much of public resources (like budget and human resources) leading to increasing transaction cost and influencing the efficiency of the universal service policies. Establishment of contractual relations will enable the implementation of the contracts between actors as well as increase the enforcement in providing universal service.

On the market perspective, the thesis suggests that the government should firstly encourage the participation of civil society and private sectors as well as aligning the interests of different actors in providing universal service. Secondly, the government should promote both supply and demand sides to enhance universal service. Both supply and demand side initiatives will complement each other to deliver universal service. Even though, in some later stages of the penetration of broadband or universal service, demand side initiatives appear to have a positive and statistically significant effect on the rate of broadband adoption higher than that exerted in the previous stages.

Keywords: Telecommunications, broadband, universal service, approaches, Vietnam

DANSK RESUME

Adgangen til bredbånd og til de mange tjenester, der udbydes via bredbåndsinfrastrukturen, bliver stadig mere vigtige for den enkelte borger, og er i alle lande afgørende for økonomisk vækst, konkurrenceevne og velfærd generelt. IKT og specielt udbygningen af bredbånd har derfor høj politisk prioritet i de fleste lande. Udviklingen af IKT kan imidlertid skabe nye former digitale skel – ikke blot mellem by og land – men også mellem unge og gamle og mellem høj- og lavindkomstgrupper. Mange lande har derfor iværksat nationale universel service programmer med henblik på at nedbryde disse skel.

Formålet med denne afhandling er at analysere de forskellige former for politiske tiltag, der i Vietnam er iværksat med det formål at nedbryde de digitale skel. Afhandlingen er baseret på fire artikler, der ud fra forskellige teoretiske perspektiver analyserer universel service i Vietnam. Ved at anvende forskellige teoretiske perspektiver, der inddrager både sociale og markedsmæssige perspektiver på den indsamlede empiri, udvikler afhandlingen forskellige metoder til at adressere problemstillingen omkring universel service i en vietnamesisk sammenhæng.

Afhandlingens hovedkonklusion er at regeringen bør begrænse sin intervention i planlægning og administration af udbygningen af bredbånd til indgåelse af markedsbaserede kontrakter med teleoperatørerne. Detailregulering af bredbåndsmarkedet har i dag medført øgede transaktionsomkostninger og faldende produktivitet set i forhold til de ressourcer, der er blevet investeret i at øge tilgængeligheden af bredbåndstjenester. Etableringen af kontraktlige relationer mellem de involverede aktører vil kunne effektivisere implementeringen af universel adgang til bredbåndsfaciliteter.

Herudover foreslås det, at regeringen anvender en markedsbaseret tilgang for at tilskynde civilsamfundet og den private sektor i øvrigt til at indgå i et samarbejde om at udbygge bredbåndsinfrastrukturen. Regeringen bør i denne sammenhæng stimulere både udbuds- og efterspørgselssiden. Udbud og efterspørgsel kan supplere hinanden i skabelsen af et bæredygtigt marked for bredbåndstjenester med national dækning. På lang sigt er det imidlertid først og fremmest en stimulering af efterspørgslen, der vil være afgørende for udbredelsen af bredbånd og for opnåelsen af en positiv effekt på velfærd og økonomisk vækst.

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The time stayed here provided me good opportunities to meet people and have interesting experiences that I will always remember. I would say thank you all for backing up me.

LIST OF PAPERS INCLUDED IN THIS THESIS

This thesis is included by four appended papers as follows:

Paper 1: Thai, D. M. & Falch, M. (2017). Universal service in Vietnam: An institutional approach. *Telecommunications Policy (2017)*, https://doi.org/10.1016/j.telpol.2017.10.003

Paper 2: Thai, D. M., Falch, M., & Williams, I. Universal service in Vietnam: The role of government. *Digital Policy, Regulation and Governance (forthcoming).*

The first version of the paper was presented at the 26th ITS Conference in Madrid, Spain in 2015.

Paper 3: Thai, D. M. & Williams, I (2017). Examining actors into boosting the provision of universal service in the Vietnamese context. *Proceedings of the 14th ITS Asia - Pacific Conference, Kyoto, Japan, 2017.*

Paper 4: Thai, D. M., Falch, M., & Salakpi, S. von Y. (2016). Universal service policy in Vietnam: A supply - demand perspective. *Nordic and Baltic Journal of Information and Communications Technologies*, *2016*(1), 123–140.

LIST OF OTHER PAPERS

The papers were also written during the doctoral time:

Paper 1: Thai, D. M., Falch, M., & Williams, I (2016). Analyzing the role of the PPP in the development of the Vietnamese Telecoms market. *Proceedings of the 1st Africa ITS Conference, Accra, Ghana, 2016.*

Paper 2: Thai, D. M. (2017). The evolution of universal service in Vietnam and its implication for 5G. Skouby, K. E., Williams, I., & Gyamfi, A (Eds). *Handbook on ICT in developing countries - 5G perspective*. River Publishers.

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LIST OF ABBREVIATIONS

ADSL	Asymmetrical Digital Subscriber Line
ASEAN	Association of South East Asia Nations
BTA	Bilateral Trade Agreement
CATV	Cable television
CPV	Communist Party of Vietnam
DGPT	Department General of Post and Telecommunications in Vietnam
DICs	Departments of Information and Communications in Vietnam
EVN	Vietnam Electricity Corporation
EU	European Union
FCC	Federal Communication Commission
GTel	Global Telecommunications Corporation
ICT	Information and Communications Technology
ITU	International Telecommunications Union
Mbps	Megabits per second
MIC	Vietnam Ministry of Information and Communications
MobiFone	Mobifone Telecommunications Corporation
NGA	Next Generation Access
NGN	Next Generation Network
NIIs	National Information Infrastructures
SPT	Saigon Post and Telecommunications Joint Stock Corporation
Viettel	Military Electronics and Telecommunications Corporation
Vishipel	Vietnam Maritime Communications and Electronic Company

VNPT	Vietnam Post and Telecommunications Corporation
VNTA	Viet Nam Telecommunications Authority
VTC	Vietnam Television Technology Investment and Development Company
VTF	Vietnam Public Utility Telecommunications Service Fund
WTO	World Trade Organisation

CHAPTER 1. INTRODUCTION

1.1. OVERALL INTRODUCTION

Nowadays, broadband networks and the services and applications that they support are increasingly becoming important to each country, and having a considerable impact on the economic growth, the global competitiveness and for its wealth (Calvo, 2012). Investment in telecommunications infrastructure or the development of telecommunications is a critical force contributing to the economic growth over the world (Cronin, Colleran, Herbert, & Lewitzky, 1993; Hardy, 1980; P. L. Lam & Shiu, 2010). According to a World Bank's study, every 10 percent increases in broadband penetration leads to an increase of economic growth, from 0.24 to 1.5 percent (The World Bank, p.6, 2012). Furthermore, Information and Communications Technology (ICT) in general and broadband networks in particular serve as means towards achieving the Millennium Development Goals as well as building an Information Society (IS) that the International Telecommunication Union (ITU) has suggested countries to carry out (The World Bank, p.297, 2012; WSIS, 2003).

To boost the economic and social development as well as to attract more investment and improve quality of life, almost all nations and regions in the world have now their own national broadband development plans[1]. Furthermore, broadband is proposed as an ecosystem including networks, services and applications that the networks carry, and users. Each of these components has been transformed by technological, business, and market developments (Raja, Kim, & Kelly, 2010). Many parts of the world nowadays not only enhance the coverage of broadband networks, but also set a target to fasten the speed of broadband up to 30 Mbps or more for all by 2020[2].

However, the distribution of broadband networks and the use of advanced data services varies widely across countries. The development of ICT has also opened out new digital divides. Although Internet access is expanding, 61 percent of the world's population are not connected yet, and less than 10 percent of the population of low-income nations can access to the internet[3]. There is not only the gap between urban and rural areas, but also the gap between the younger and the older generations and the gap between the higher and the lower income users (Blackman & Srivastava, 2011). These gaps will widen further in the coming years if governments do not take

[1] According to a report of the ITU and UNESCO in 2013, namely 'The state of broadband 2013: Universalizing broadband' there were 149/192 nations/regions in the world having national broadband development plans (in which 12 nations were building up their plans).
[2] European Commission: Press release IP/13/968 on 17 October 2013, Brussels, Belgium.
[3] World Economic Forum-2015. 'The Global Information Technology Report 2015: ICTs for Inclusive Growth' edited by Dutta, Geiger, & Lanvin.

actions to bridge it. Many nations in the world have embarked on deploying universal service programs to close the digital divides.

Universal service policies play a critical role on bridging the digital divide. Universal service refers to the accessibility of users to basic telecommunication services at affordable prices regardless of where and who they are. According to the ITU, universal service has three fundamental characteristics: availability, accessibility and affordability. The main target of universal service is to ensure that individuals have access to basic telecommunications services regardless of geography, gender, ethnicity, disabilities or other factors. Laffont & Tirole (2000) indicate that the objectives of universal service are: the redistribution of telephony towards low income residents, handicapped customers, and rural inhabitants; and regional planning that promotes to bring more potential benefits to rural areas. They also point out that universal service:

> *'ensures quality of telecommunication services at affordable rates to consumers, including low income consumers, in all regions of the nation, including rural, insular, and high cost areas'*

However, there is no consensus on the concept of universal service in the world. The concept of universal service has constantly changed (Alleman, Rappoport, & Banerjee, 2010; Calvo, 2012) due to the development of technology and society (Levin, 2010). Previously, universal service has been referred to fixed-line voice services, but many countries nowadays include dial-up and broadband internet in universal service (Calvo, 2012; Levin, 2010).

There have been different approaches pursued by countries to enhance universal service, such as: market based reform, mandatory service obligations, leveraging new technologies (e.g. mobile), leveraging new business practises, cross-subsidy, access deficit charges, universal funds, public-private partnerships (Blackman & Srivastava, 2011). However, there is no one-size-fits-all policy. Countries developing policies base on their own differences in society, market and institutional structures (Lemstra & Melody, 2014).

In this circumstance, Vietnam provides a unique example of this. Vietnam liberalized telecommunication markets in 1994, but the Communist Party of Vietnam still exercises a strong influence on the telecom agenda, and the strategy applied for meeting universal service objectives. Furthermore, almost all actors who have deployed universal service policies are state-owned entities, lack of involvement of private sectors or social civil. The approach implemented is the top-down based on the administration regime. The initiatives to enhance universal service have focused much on the supply side rather than the demand side, and lack of initiatives to promote the adoption in the long run. This regime achieved some success, however also

revealed many drawbacks. This study attempts to look at universal service policies in Vietnam under various angles: such as market perspectives (like a supply-demand side and stakeholders) and social points of view (like culture, demography, and institutions) in order to understand why these drawbacks exist and how they serve as obstacles influencing the development of universal service. Based on this exercise, policy recommendations will be provided to enhance universal service. These recommendations will be also useful for others developing nations to consider.

The thesis is a cross-disciplinary research that applied different theories and models to analyse universal service. The empirical data for the case study was gathered from Vietnam. The diversification of a variety of analytical perspectives will strengthen the understanding on the weakness and strength of universal service policies in Vietnam.

1.2. MOTIVATION

Vietnam is an emerging market in the world and a member of the ASEAN. Its population in 2014 reached about 90 million people, ranked 3rd in ASEAN (after Indonesia and the Philippines) and 14th in the world. Having reformed telecom sector since the 1990s, Vietnam has made some achievements and was ranked 10th in Asia in terms of the volume of the internet users in 2012. In initial days of the reformation, the usage of ICT was not ubiquitous. Vietnam had less than 1 million fixed line subscribers, the tele-density was 0.4%, and only 23,500 mobile phone connections in 1995 (Ha, Thanh, & Gullish, 2005). However, twenty years later in 2016, the market has significantly grown: the total number of mobile phone subscribers (2G and 3G) reached 128,996,179 and the number of internet users was 50,231,474 people, and the rates were 139.2 and 54.19 percent, respectively. In which, the mobile broadband internet subscribers were 36,108,428, the subscribers of fixed broadband internet were 9,098,288, and the rates were 39 and 9.8 percent respectively [4]. Nevertheless, a big gap of penetration of broadband internet between urban and rural areas has persisted. Whilst, urban inhabitants are living in high-speed internet access, less than 1 percent of rural households had any type of internet assess in 2008 (Tuan, 2011).

In order to bridge the digital divide, Vietnam has proactively undertaken initiatives, such as: establishing the Vietnam Public Utility Telecommunication Service Fund, (VTF) and building up programs to deliver universal service in rural areas. Since 2005, the central government has launched two programs on provision of universal service, the 'Program on provision of universal service until 2010' (the Program 74) and the 'Program on provision of universal service until 2020' (the Program 1168). The Program 74 was implemented within five years, from 2005 to 2010. The Program 1168 has been being deployed since 2015. However, due to insufficient experience to

[4] Vietnamese Ministry of Information and Communications (2017). *Information and Data on Information and Communication Technology-Vietnam 2017*. Hanoi, Vietnam

formulate and run the Programs, MIC usually has to issue regulations to direct other actors running the Programs or submit to the Prime Minister to modify the Programs (the Program 1168 is being modified in 2017). The results of the Program were unsustainable. Many rural users gave up using universal service when the central government stopped funding. On the other hand, with a limited budget to deliver universal service, the question rising up is how utilise the budget to maximize ICT benefits for rural users. Hence, this project adopted aims at identifying and analysing approaches to enhance universal service in Vietnam.

1.3. PURPROSE AND OUTCOMES OF THE THESIS

The research aims to analyse universal service policies in order to identify issues on universal service provision. Based on that, recommendation of appropriate approaches to remedy shortcomings and boost universal service provision in rural areas is to be drawn. Hence, the main research question is:

RQ: *What are the approaches that Vietnam should pursue to enhance universal service?*

There are many ways to promote universal service or broadband services, however no one-size-fits-all policy has been developed. According to King et al. (1994), institutional factors enable the certainty and clearness in national IT policies. Yamakawa, Cadillo, & Tornero (2012) show that it is indispensable to look at critical factors in formulating policies to advance broadband services in developing nations, such as: the promotion of supply (expand network) and demand (adoption of services); the alignment of interests of stakeholders; and the facilitation of competition. Based on these suggestions from the literature, the research looks at universal service policies in Vietnam to identify: which did institutional factors influence and who participated in the formulation and implementation of these policies; what and how were actors' interests translated into initiatives promoting the universal service provision; and what kind of strategies has the government pursued.

In other words, to achieve the main objective, the research analyses the universal service policies under social and market perspectives. From the social perspective, the author recruits Institutional Theory and Actor Network Theory to look at institutional factors influenced universal service policies, and actors translated and inscribed their interests into these policies. From the market perspective, the author applies Stakeholder Theory and Supply - Demand Sides to examine actors participated in the formulation and implementation of the universal service policies, and initiatives that the central government have applied to enhance universal service. As Patton (1999) calls this method a theory triangulation that uses different theoretical perspectives to look at the same data to understand how findings are affected by different assumptions and fundamental premises. Further discussion of the adoption of these theories is

provided in Chapter 4. Based on these findings and cooperated with the literature (Chapter 2) on universal service/broadband development policies from other nations, appropriate approaches to enhance universal service will be recommended.

To answer the main question, the research follows four sub-questions:

S1. Which institutional factors influenced the universal service policies?

S2. Who participated in deploying the universal service policies, and what were kinds of initiatives applied to provision of universal service?

S3. How did actors translate their interest into formulating and implementing an initiative?

S4. Which the supply or demand approaches Vietnam should pursue to enhance universal service?

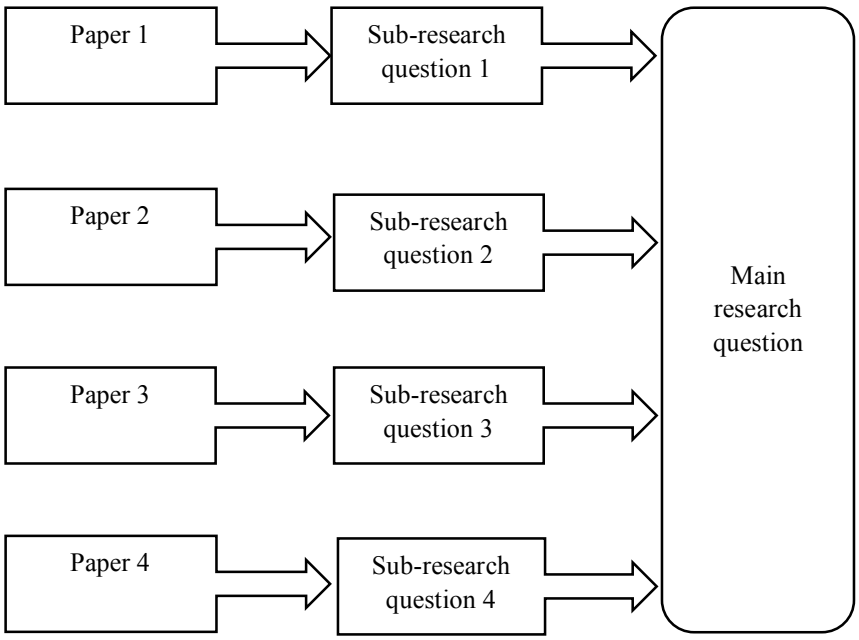

Figure 1: Relationships between appended papers and sub-questions towards the main question

The four appended papers answer to the four sub-questions respectively and are also a part of the answer to the main research question (further discussion of the four papers is provided in Chapter 5 and 6). Figure 1 shows relationships between the appended papers and the sub-questions towards the main question of the thesis.

Expected outcome of the thesis is to provide appropriate approaches for Vietnam and other developing nations to enhance universal service.

1.4. SCOPE AND DELIMITATIONS OF THE THESIS

While there are many ways to enhance universal service. The thesis looks at approaches from a government point of view with analyses under social (like culture, demography, and institution) and market perspectives (like supply-demand sides and stakeholders). Due to the increasing importance of ICT in general and broadband networks in particular, developing countries have been implementing their own broadband plans to realize the benefits that broadband can bring to their country and citizens (Kelly & Rossotto, 2012). This thesis thus looks at regulations under social and market perspectives in order to get insights into how the two perspectives influenced the formulation and implementation of the universal service policies in Vietnam. The four appended papers were analysed under the two perspectives.

Universal service policies here refer to initiatives, strategies, or programs formulated and deployed by related entities to promote universal service. Universal service includes not just telecommunications services, such as fixed/mobile telephone and dial-up/broadband internet services, but also initiatives to improve ICT skills/knowledge.

1.5. STRUCTURE OF THE THESIS

The thesis that is written up by combining the four papers is organised as follows:

Chapter 1 presents the objectives, motivations, scope, outcomes and structure of the thesis.

Chapter 2 provides an overview on the evolution of universal service since it appeared until now. This chapter also provides justifications of universal service policies to show why we need universal service policies, and where we can provide universal service. Finally, this chapter introduces approaches to enhance universal service in general.

Chapter 3 introduces universal service in Vietnam and discusses problems about universal service. Before that, an overview of the telecommunications market in Vietnam is illustrated.

Chapter 4 presents methodology and an analytical framework that directs the whole PhD project to do research. Next, reflections of these theories adopted for each paper are provided to justify how these theories were selected, and what could they contribute to the analysis of each paper as well as the thesis. Finally, the chapter explains how the author gathered data, and what types of the research method the thesis followed.

Chapter 5 provides a summary of the four papers that are included in the thesis. Each summary presents purposes, essential points and findings.

Chapter 6 analyses the findings of each paper and discusses how these findings contribute to the main thesis. Based on these, policy recommendations are drawn. Lastly, conclusions of the thesis are also provided.

CHAPTER 2. LITERATURE REVIEW OF UNIVERSAL SERVICE

This chapter presents an overview on the evolution of universal service since it appeared until now. The chapter also provides justifications of universal service policies to show up why we need universal service policies, and where we can provide universal service. Finally, the chapter introduces approaches to enhance universal service in general.

2.1. UNIVERSAL SERVICE

2.1.1. THE EVOLUTION OF UNIVERSAL SERVICE

The concept of universal service in telecommunications was initially appeared by Theodore Vail of the Bell System in a campaign protecting monopoly in 1907 (Garnham, 2001; Mueller, 1993). At that time, after Alexander Graham Bell's patent on the telephone device expired, many new local exchange telephone companies emerged and fiercely competed to AT&T. However, their networks could not connect to those of AT&T. As a result, a customer of one provider could not call a customer of another provider. As such, Vail issued a strategy called 'One System, One Policy, Universal Service' that called for an interconnection between these networks (Parsons & Bixby, 2010). According to Mueller (1993) universal service by Vail meant an integrated system that could interconnect all telephone users, not by providing basic telephone services to all users. However, this strategy also requested for political support to protect its monopoly (Mueller, 1993).

In the United States, the year 1934 witnessed an important milestone in the telecommunication sector as the Communications Act was passed and established FCC to regulate interstate telephone service. Despite of not mention about universal service (Mueller, 1993), the Act created the potential development of federal universal service policies (Parsons & Bixby, 2010). The concept of universal service was then gradually arisen via cross-subsidy of local telephone services by AT&T's long-distance telephone service (Mueller, 1993; Parsons & Bixby, 2010). From 1934 to 1996, no universal service regulation was issued, until 1996 as the Telecommunication Act was enacted (Parsons & Bixby, 2010). This Act introduced goals of universal service that ensured the provision and the connection to advanced telecommunications services at reasonable and affordable rates throughout the country (Parsons & Bixby, 2010).

In Europe, the concept of universal service has been a result of the liberalization of telecommunications (Bauer, 1999; Garnham, 2001). Prior to the 1990s, supplying

telecommunications services were public service missions implemented under a monopoly regime. The mission implied that 'the State took responsibility for providing universal geographical coverage within its borders' (Garnham, 2001). However, due to the change of technology and the weakness of the public service model, policy-makers accepted competition (Bauer, 1999). Universal service at that time was a minimum set of services available to all users at an affordable price independent of their geographical location[5]. According to Bauer (1999), European State members can develop a more ambitious definition of universal service but they cannot fund such programs from market participants.

Whilst in Asia (South Korea and China) the concept of universal service was adopted later. It is also a result of the privatization and liberalization of telecommunications sector (Daeho, 2008; Zhao, 2007). In South Korea, the government in the 1980s introduced the policy 'Widening and Automation' that its motto was 'One Household, One Telephone' and aimed at narrowing down the geographical gap in telecommunications provision (Kim & Lee, 1991). However, until 1998 the universal service regulation was promulgated (Daeho, 2008). This concept of universal service here also focuses on equal basic access and market efficiency (Daeho, 2008). In China, in the 1950s the central government announced the slogan 'Upstairs and Downstairs, Electric Lights and Telephone' presenting goals of constructing the socialism in which providing telephone service was a critical aim. However, prior to the 1990s the concept of universal service never explicitly appeared (Zhao, 2007). Due to the telecommunications structural reform, and the domestic and international trend the concept of universal service was first stated in 2000 in the Telecommunications Regulation of China (Jayakar & Liu, 2014; Zhao, 2007). It regulated telecommunications carriers should perform their obligation of providing universal service in line with the state regulations (Jayakar & Liu, 2014).

Nowadays, the concept of universal service is usually expanded and different across countries, due to the change of technology and the development of economy and society of each country (Levin, 2010; Msimang, 2012). Many countries have adopted dial-up and broadband internet connections in their universal service. In the United States, broadband networks are, part of universal service, considered as a foundation for economic growth, job creation, and improving well-being. In Europe, universal service (Internet connections) is elevated as a fundamental right to protect fundamental human rights (Calvo, 2012). In South Korea, universal service not only includes basis telephone services (local calls, emergency calls, and discount-rate phone service) for the disability, low income people and residents of remote areas, but also calls for including broadband and mobile services into its scope (Calvo, 2012;

[5] First Monitoring Report on Universal Service in Telecommunications in the European Union. Commission of the European Communities (Brussels: February 25, 1998). Available at http://aei.pitt.edu/13175/1/13175.pdf

Daeho, 2008). In China, the central government has constantly issued universal service programs to bridge digital divides, from providing connections (telephone to every village) in 2004, and then improved this program by delivering broadband network to 95% of townships and providing applications and information to every village in 2009 (Jayakar & Liu, 2014; Xia, 2016b).

According to Cremer, Gasmi, Grimaud, & Laffont (2001) there are four factors to look at whether a service should be included in universal service: 'the service is essential to education, public health or public safety; the service has been subscribed to by a substantial majority of residential customers; the service is being deployed in public telecommunications networks by telecommunications carriers; and the service is consistent with the public interest, convenience and necessity'.

To sum up, the ITU defines universal service and universal access separately. According to the ITU, universal service refers to services at individual or household level; while universal access refers to connections to services at public telecom points. However, many countries apply universal access and universal service at the same time, thus it makes sense to use the generic term of universal service and access (Blackman & Srivastava, 2011). Universal service and access has three fundamental features: availability, accessibility, and affordability. Those ensure individuals to be accessible to basic telecommunications services regardless of geography, gender, ethnicity, disabilities.

2.2. JUSTIFICATIONS FOR UNIVERSAL SERVICE POLICIES

As the liberalization period coming, using public budget to finance and subsidize for the telecommunications market in general and universal service in particular is always a controversial issue with policy makers (Laffont & Tirole, 2000). The questions of why States could intervene in the telecommunications market without distorting competition, and what rationales for universal service policies need to make clear. This section describes briefly main ideas of theories of regulation before providing justifications of subsidizing universal service.

2.2.1. THEORIES OF REGULATION

Based on the Stiglerian approach, Viscusi, Harrington Jr., & Vernonm (2005, p.381) sum up that regulation is one way to increase a group's interest by having the state redistribute wealth from other parts of society to that group. According to Stigler (1971, p.3) the demand for regulation is due to the potential uses of public resources and powers to improve the economic status of economic groups. And because of the characteristics of the political process which allow relatively small groups to obtain such regulation, a theory of supply of regulation is provided. As such, it makes sense

for governments to provide regulation in redistributing welfare and enabling the equity in society.

Theories of regulation consist of three main ideas, such as: (1) regulation is supplied in response to the public's demand to correct a market failure or to implement equity (positive theory); (2) regulation is supplied in response to the industry's demand for regulation, in other words regulators are captured by the industry (capture theory); and (3) regulation is supplied in response to the demand of interest groups acting to maximize their income (Viscusi et al., 2005). It puts forth a set of assumptions and generated predictions about which industries would be regulated and what form regulation would take as logical implications of these assumptions (economic theory of regulation). These theories make explanation of who benefits from regulation, which industries are most likely to be regulated, and what form regulation will take. Although being criticised for inefficiency to explain the mechanism that give rise to regulation, and for inconsistencies with respect to empirical regularities (Viscusi et al., 2005), these theories are necessary to observe regulation of broadband[6] due to the role of government in promoting public welfare and influencing industry as an 'enabler' and 'rule maker' (Picot & Wernick, 2007). Hence, they are important to explain the necessary of regulation in universal service field.

2.2.2. RATIONALES FOR UNIVERSAL SERVICE POLICIES

2.2.2.1. Why?

Universal service policies as a tool to reach equity

Equity refers to using public funding to provide the need otherwise disadvantaged people or regions may not fully participate in economic, political, and social life (Cave & Martin, 2010). According to Gómez-Barroso & Pérez-Martínez (2005), connecting to telecommunications services, from an economic view, increases opportunities for employment and accessing qualifying training as well as reduces poverty. On the other hand, from a social view, they assume that it also facilitates for a broadly understood community participation, for access to education, and for integration of marginalized groups. It is apparent that, provision of universal service is one of ways to enable equity and public welfare in society, thus it needs State regulation (Viscusi et al., 2005). Indeed, the concept of universal service defined by ITU implies the equity as it states that universal service ensures accessibility to basic telecommunications services regardless of geography, gender, ethnicity, and disabilities.

Universal service policies as means to supply a public good:

[6] Broadband network is kind of telecommunications infrastructure.

A good is considered as a public good if it has two characteristics: non-excludability and non-rivalry. Non-excludability refers to a user impossible to be excluded from consuming a service or product. Non-rivalry regards to a consuming a service or good that does not reduce the availability to others. Universal service here meets both of two characteristics of public goods. Firstly, telecommunications services are means to improve welfare, function democracy and ethical reasons. The availability of a telecommunications network is by itself valuable to society, thus it cannot be excluded (Cremer et al., 2001; Picot & Wernick, 2007). Secondly, anyone accesses a network does not reduce its usefulness for others using it (Gómez-Barroso & Pérez-Martínez, 2005). Hence, implementation of universal service policies makes contribution to providing public goods (Cremer et al., 2001)

Universal service policies as an instrument to develop economy and a political process:

There are many researchers showing the causality between telecommunications and economic growth. Telecommunications not just improve productivity but also create more jobs in rural areas and recover economy (Cave & Martin, 2010; Falch & Henten, 2010). The absent of telecommunications services is considered as a sign of underdevelopment (Gómez-Barroso & Pérez-Martínez, 2005). A World Bank study states that every 10 percent increase in broadband penetration has led to an increase of 0.24 to 1.5 percent in economic growth (Kelly & Rossotto, 2012). Obviously, universal service policies bring much benefit to rural areas, it provides infrastructure, new technologies, and services and applications. And, with regard to political perspective, policy makers try to maximize these benefit that universal service policies provide (Cremer et al., 2001). In China, universal service is a critical part of the government policies because of increasing their awareness of the negative consequence of uneven development (Jayakar & Liu, 2014).

Universal service policies as a remedy for a network externality:

Many scholars have agreed that telecommunications network provides network externalities (Cremer et al., 2001; Gómez-Barroso & Pérez-Martínez, 2005; Katz & Shapiro, 1985). Network externalities occur as a user purchasing a telecommunication service can get benefit from accessing to pre-existing users on that network. In other words, the more subscribers have joined the network the more benefit they can get (in the case not congested). Network externalities can be generated via a direct physical effect of the number of customers, or via an indirect effect of the amount of services available that develops simultaneously with the number of users (Gómez-Barroso & Pérez-Martínez, 2005). Providing universal service offers several benefits for people living in rural and remote areas. It is seen as a solution to correct a market failure (Cremer et al., 2001).

2.2.2.2. Where?

To assist its member states to fund subsidies to provide universal service/NGA networks as well as limit distortions of market, many international organizations (ITU and EU) provide guidelines to direct their members to follow.

Based on two dimensions: the poverty and high-cost areas, ITU divide the into three areas: 'Market efficiency gap', 'Smart subsidy zone', and 'True access gap' (Figure 2).

'The market efficiency gap' is the gap between the service reach. This gap may be achieved in a fully liberalized and efficient market. With this market, the regulators need ensure a level playing field among all market participants. 'The smart subsidy zone' is rural or high cost areas, and low-income population groups that will not be reached by the market alone. These areas should be financed by the government. However, this funding is like a catalyst to attract investors to come here and will be stopped as these areas become commercial. 'The true access gap' is areas where people cannot be affordable to use services if no subsidies from the government (Blackman & Srivastava, 2011).

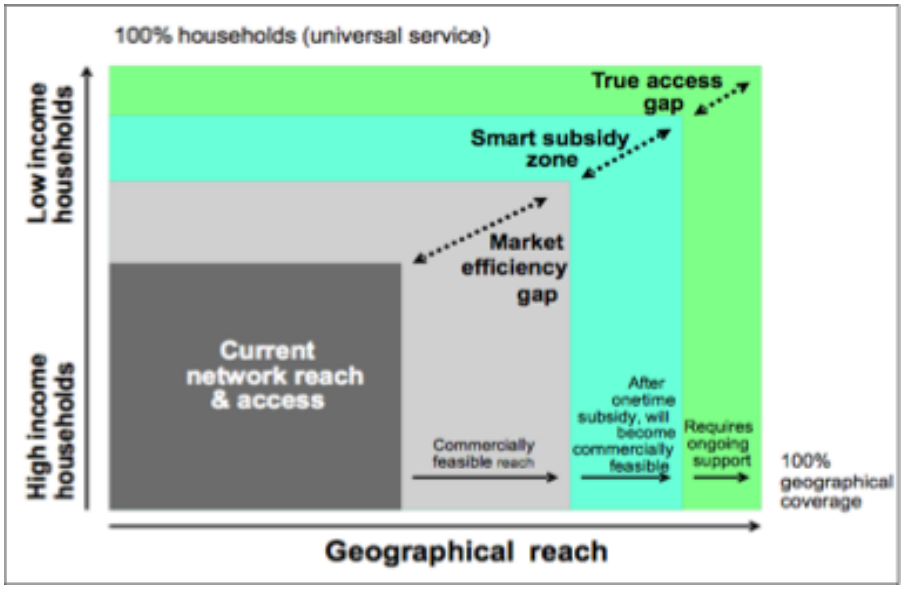

Figure 2: *Universal service - Distinctions within the access gap*

Source: Blackman & Srivastava (2011)

Also, dividing the market into three areas to consider providing State aid to deploy NGA networks, EU defines these areas differently from ITU does. According to them, 'white areas' are those in which there is no broadband infrastructure and it is unlikely to be developed in the near future (within 3 years). 'Grey areas' are those in which one network operator is present and another network is unlikely to be developed in the near future. 'Black areas' at least two NGA networks of different operators exist in a given area or will be deployed in the coming 3 years (European Commission, 2013). In which, 'white areas' and 'grey areas' can be considered to provide State aid. However, the aid has to comply with the following conditions: Contribution to the achievement of objectives of common interest; Absence of market delivery due to market failures or important inequalities; Appropriateness of State aid as a policy instrument; Existence of incentive effect; Aid limited to the minimum necessary; Limited negative effects; and Transparency.

Basically, both two giant organizations support to fund subsidies to deploy universal service/NGA networks in order to enable the equity and correct market failures. Besides, they also stress the importance of limiting distortions of competition as providing State aid.

2.3. APROACHES TO ENHANCE UNIVERSAL SERVICE

This section reviews literature on the role of government and approaches to enhance broadband penetration and universal service.

2.3.1. THE ROLE OF GOVERNMENT

The state is a potential resource or threat to every industry in the society. It can selectively help or hurt a vast number of industries with its power to prohibit or compel, to take or give money (Stigler, 1971). In the telecommunications sector, the role of government plays critically and has been widely accepted by many researchers. Their role has been illustrated via their initiatives such as: promoting competition, facilitating entrants to enter the market, providing users with training courses, or supporting for broadband roll out. More specifically, based on the government's activities Gillett, Lehr, & Osorio (2004) and Lemstra & Melody (2014) categorize into several types of role that government can play.

From the local level, Gillett, Lehr, & Osorio (2004) group the government activities into four types, such as: '(1) Government as broadband user. The Government indirectly attracts commercial broadband deployment through demand side policies. Particularly, the government uses its local leadership role or its role as a major telecommunications customer to assess, stimulate or aggregate demand. (2) Government as a rule maker. The government adopts or reforms local ordinances that affect the ease of commercial deployment, such as rights-of-way, utility pole

attachments, road and building construction codes, zoning policies affecting wireless antenna placement, and cable franchise agreements. (3) Government as financier. The government provides subsidies for broadband users or providers, which may be direct or indirect in the form of planning or equipment grants, tax credits, or other incentives. (4) Government as infrastructure developer. The government adopts supply side policies in which a division of the local government is ultimately responsible for the provision of one or more components of network infrastructure'.

From the national level, Lemstra & Melody (2014) look at twelve European countries' broadband development policies and distinguish the government's role as: setting the national Digital Agenda, stimulating the demand side, removing barriers, a chief architect, and bridging the digital divide. They conclude that the market development can be supported by either private or public actors, and depending on political and economic circumstances governments can pursue top-down or bottom-up approaches. However, they argue that promoting competition is a leading principle.

In short, governments play an important role in boosting the development of the telecommunications market both at local and national level. They not only help 'a vast number of industries' develop further (e.g. removing barriers, facilitating entrants, and promoting competition) but also stimulate and aggregate demand as being a large user and delivering training courses to citizens.

2.3.2. APPROACHES TO ENHANCE UNIVERSAL SERVICE

Strengthening the diffusion of ICTs is a major policy goal of nations to ensure the full participation of all in the Information Society as well as to get all benefits and transformational opportunities of ICTs (Blackman & Srivastava, 2011). Different countries, based on their own social and economic circumstances, apply different approaches to maximize the possibility of availability, affordability and accessibility of telecommunication services (Calvo, 2012).

According to Blackman & Srivastava (2011), many strategies may be pursued to widen universal service such as: Market based reforms; mandatory service obligations; leveraging new technologies, e.g., mobile; leveraging new business practices, e.g., pre-paid cards; cross subsidies; access deficit charges; universal funds; and public-private partnerships. They may also carry out regulatory reforms based on a market regime aiming to create incentives for the private sector to extend universal access, establishing interconnection frameworks, flexible spectrum rules and other technology-neutral policies to encourage the entry and use of new and innovative technologies and provide a wider range of participants to achieve universal service goals (Blackman & Srivastava, 2011). More specifically, there are various kinds of factor influencing the efficiency and the success of initiatives or approaches. These

factors may come from the social aspects (culture, demography, and institutions) or arise from the market aspects (supply-demand side, stakeholders, and costs).

With regards to social aspects

Looking at the formulation of national information infrastructures (NIIs) under the national cultural factors, by comparison of forming NII policies from seven nations Garfield & Watson (1998) indicate that culture plays a critical role in the development of NIIs. They conclude that NII policies seem to be more successful if countries design these policies appropriate to their culture. Even mimicking the successful NII policies of other nations, they suggest that the governments should follow the nations who are also similar to their culture.

Choudrie & Lee (2004) look at the broadband development in South Korea under institutional and cultural factors in order to investigate factors influencing the success of the broadband development policies. By using documentary secondary and primary data, the authors show that government leadership, cultural, geographic and demographic aspects, and fierce competition factors are the main factors contributing on the significant success of South Korea.

With regards to market aspects

There are also a lot of researchers discussing about the influence of market factors, particularly supply and demand factors on broadband development/universal service policies (Falch, 2007; Jeanjean, 2010; Jordana, Fernández, Sancho, & Welp, 2005; Trkman, Jerman Blazic, & Turk, 2008; Youtie, Shapira, & Laudeman, 2007). On approaches to the supply side, governments may boost broadband take-up via initiatives such as market liberalization, promotion of competition, appropriate market regulations, and direct infrastructure investments. On approaches to the demand side, governments may stimulate adoption of broadband services and applications by raising awareness of its benefits, improving skill of ICT usage, and making it affordable and more attractive to users (Kelly & Rossotto, 2012).

Initiatives on the supply side

Based on public-goods and competition-based perspective on regulation Picot & Wernick (2007) analyse the role of government in fostering broadband deployment in the United States, Korea and Europe. The authors argue that due to the increasing importance of broadband networks, governments themselves should consider as a public-good and take responsibility to introduce policies aiming at assisting and furthering the construction of broadband networks, such as policy on subsidy to network-builders operating in the private sector (Sweden); or funding of innovative pilot projects (UK); or the provision of loans at preferential rates to facility-based

service providers to launch broadband networks (Korea Information Infrastructure project). Additionally, the paper notes that emphasis on competition regulation is also critical to broadband roll out. By illustrating various policies of three countries, the paper concludes that successful government strategies should consider both public goods and competition-related aspects of broadband.

Likewise, Gillett et al., (2004) argue that local governments may represent as a broadband user, a rule-maker, a financier, or an infrastructure developer. As a rule-maker, the paper points that governments can reform their policy to reduce the cost and shorten the time required for private-sector deployments, for instance easily access to local facilities, coordinated plans and industry-specific regulation. In terms of role as a financier, governments may use financial incentives to promote both investment and broadband services usage, like outright grants, low-cost loans or tax incentive for providers, equipment or service for users and training, planning grants for community groups. Regarding the role as an infrastructure developer, governments adopt supply side policies in which a division of local government is ultimately responsible for the provision of one or more components of network infrastructure. Finally, as a big buyer (from demand-side perspective), local governments may either aggregate fragmented demands to negotiate with providers for gaining discounts, or create compelling contents and applications to drive adoption, such as education, health care or delivery of government services.

In addition, the study of Kalra & Borgohain (2004) take into account intervention of government to promote expanding telecommunication networks in Indian rural areas. Based on analysing documentary secondary data, the paper argues that the government needs to introduce a new license policy permitting small and medium firms to enter into rural areas where previously only large companies were legally operated. Furthermore, a flexible charge policy allowing a rural operator to charge a marketability-based price of telephone services is essential to ensure cost efficiencies.

Whilst Peha (1999) presents a novel model called Tradable Universal Service Obligations to foster infrastructure expansion into unserved areas. By qualitatively analysing the advantages and disadvantages of three approaches: build-out requirements, universal service funds, and targeted implicit subsidy obligations, the author points out that all of three approaches are lack of flexibility. Based on the air pollution limit policy in the United States, he proposes firms are free to buy, sell and trade universal service obligations that suit firms' ability. As a result, firms are likely to implement their universal service obligations more effectively and efficiently. Similarly, Falch & Anyimadu (2003) present a model of tele-centres as a way to achieve goal of universal access in Ghana. This is a field study aiming at evaluating the role of tele-centres in the provision of telecom access in Ghana. By carrying out interviews with 62 tele-centres, the paper points out Ghanaian tele-centres have influenced the creation of regional development and cohesion, provision of access to

IT and telecom facilities, promotion of diffusion of usage and knowledge of IT and training, provision of access to IT-related business services, and creation of local employment.

Falch & Henten (2010) take into consideration the role of public private partnership (PPP) as an instrument to foster investment in broadband. Using case studies in Australia, Korea, US and EU the authors find that PPP projects are a way to stimulate early uptake of broadband services. In the long term, however, the positive impact may be outweighed by the potential negative impact on competition.

Initiatives on the demand side

With regard to overseas research, many researchers have analysed factors influencing the demand for broadband. By using a discrete choice framework and data from a survey in order to analyse factors influencing the demand for basic Internet service among American households, Chaudhuri et al., (2005) show that income and education are the strongest factors of dual Internet access. Besides, other characteristics such as marital status, racial categories and gender also impact on the penetration of basic internet. Interestingly, the paper concludes that the price factor has a modest effect on Internet subscription decision and it is not a key tool in bridging the digital divide. However, in another research, by the same author, Flamm & Chaudhuri (2007) also point out that price factor is a key driver of broadband demand.

Also, examining factors to close an urban-rural broadband gap in America LaRose et al., (2007) argue that to boost demand for broadband service in rural areas policy makers should stimulate the personal benefits of broadband and advanced ICT literacy skills among Internet users.

Whilst, based on empirical research via a survey of 172 households in terms of broadband adoption in London, Choudrie & Dwivedi (2006) identify that in order to understand and promote the adoption of broadband in households governments and Internet service providers should look at factors such as faster access, always-on, effective business performance, and entertainment.

Research on universal service in Vietnam

There is little research done on promoting the penetration of universal service in Vietnam. Inter alia the research, Long (2010) and Lam (2013) studies are the most considerable research. Both researchers here look at universal service policies under social (legal and institution) and market perspective (a demand side).

From the legal and institutional perspectives, Lam (2013) looks at the legal and regulatory frameworks, and institutional structures regarding to universal service in

Vietnam. He argues that due to applying a top-down of funding administration resulted in overlapping institutional responsibilities, ineffectiveness of external monitoring, and lack of involvement of stakeholders and the public. Additionally, due to not relying on principles of cost-effectiveness and competitive neutrality between operators in terms of allocating levies and providing subsidies, so the provision of universal service was inefficient and ineffective. Based on a comparison between Vietnam and the New Zealand universal service scheme, he suggests that it is necessary to amend to government and ministerial legal documents, and legislation by the National Assembly. He concludes that best practice models rely primarily on key aspects such as transparency, accountability, public access to information, skilled financial management and competition.

Long (2010) states that due to focusing much on the supply side, universal service policies in Vietnam encounters some problems. Hence, in his PhD project, he looks at the demand side. He examines customers' preferences for internet service in rural areas of Vietnam. The author uses the stated preference method to investigate the rural consumer behaviour and the join analysis and discrete choice model based on the random utility framework to describe preferences of consumer to rural internet adoption and usage. By analysing data compiling from a survey of 600 users in 13 provinces at Vietnam, the author points out that entertainment and news are the most preferred internet applications of rural citizens while education, agriculture, and health information are less preferable. The factors such as living location, income and education are main reasons resulting in the gap in the internet in the rural areas. Hence, the author recommends policy makers should focus on narrowing the gap caused by those factors.

Apparently, there are various ways to enhance the penetration broadband services/universal service. However, there is no one-size-fits-all policy. Each nation bases on their own economic and social conditions to develop their own policy.

Universal service policies in China

There are a lot of researchers on universal service in China, however most of them have looked at under the social perspective. China initially focused on universal service in the early 2000s and launched the 'Village Access Project' in 2004 (Jayakar & Liu, 2014; Xia & Lu, 2008). This project assigned six state-owned operators to install at least two phones in every administrative village, one of them was a public phone. At the end of 2007, this project achieved success, 99.5% of administrative village was connected (Jayakar & Liu, 2014; Xia & Lu, 2008). In the following years, Ministry of Information Industries (or Minister of Industry and Information Technology later) has expanded this project by connecting to natural villages, providing broadband to townships, and promoting operators to develop information services (the expanded project is also called the 'Information to the Countryside' or

'Village Infomatization Program'). In his research, Xia (2016) looks at some projects in China under institutional theory. He shows that the Village Access Program was successful due to the involvement/participation of all political/administrative levels by putting regulatory enforcement in effect, or as Xia defines this factor as an ideological - administrative guardian[7] included the Communist Party of China Central Committee, the State Council, Ministries and regulators, Provincial governments, local governments, and grassroots governments. He insists that the regulative factor plays a substantially critical role in formulation and implementation of universal service policies in the Chinese context rather than those of normative and cultural-cognitive factors. Furthermore, he indicates five institutional factors affecting implementation success of a universal service policy such as: political/ideological motivation, provincial/local attentiveness, responsible agency with expertise, project involvement, and engagement of keystone species (telecom operators). In his paper, he shows that the rural information policy in China has emphasized much more the supply-side access level while ignoring the demand-side like the end users and finally failed in engaging the application level.

In another research on Chinese rural information policies that provides rural villagers access (telephone, television, and internet access) and applications (comprehensive information services), Xia (2010) shows that due to the ambiguity in specific objectives and institutional arrangement of the 'Village Informatization Program' (VIP), the VIP has been fragmented or decentralize by ministerial or provincial initiatives that have not been integrated or connected together. As a result, these have led to incompatibilities between these initiatives' outcome (e.g. the incompatibility between one information portal and another one in terms of system configurations and contents provided). Even though, some information services stations are mainly used for online games or visiting chat rooms rather than providing rural villagers 'comprehensive information services'. To solve these issues, Xia proposes a layer-based localization model which delineates provincial/local roles with central roles based on a stratified incentive policies and the governance structure. In this model, he argues that the central government should be only responsible for provision of access (telephone and television). The provision of 'comprehensive information services' (applications) should leave to provincial/local government designed and deployed. Furthermore, he suggests that it is necessary to build up a commission at each administrative level (centre, province, municipality, and county level). These commissions collect and integrate all ministerial/provincial initiatives relating to rural

[7] The ideological-administrative guardian is a role embedded in the party-state hierarchy exercises regulatory enforcement, and dominates institutions supply (Xia, 2016a). The ideological-administrative guardian includes actors like Communist party of China's central committee, State council, Ministries & regulators, Provincial governments, local governments, and grassroots governments.

information policies as well as to administers and provide guidelines for the VIP project.

Also looking at the China rural infomatization policy, Liu (2012) modifies the 4C model and the 'Digital Access Index' model to analyse the case of Sichuan province. He shows that due to the lack of a clear vision or a coherent strategy (such as different government departments have designed different agricultural informatization programs; projects focus much on delivering infrastructure, no caring of providing information), and no a sustainable model (based mainly on the government subsidies or profitable areas) the Sichuan's rural infomatization projects are facing difficulties. Based on these findings, he provides some recommendations: the boundary between the central and provincial government should be made clear. Connectivity could be treated as a national issue, content should leave to provincial governments; agricultural infomatization should be part of universal service and written in the new telecommunications law; and the government should utilize the resources of non-government organizations.

Similar to the approach of Liu (2012), Ting & Yi (2013) also analyze rural informatization projects under the case of Guangdong province, China. Via conducting interviews and the fieldwork, Ting & Yi (2013) identify institutional issues in executing two projects here, such as the overlap/rivalry between these projects of two government departments (Department of Information Industry and Department of Science Technology) in terms of objectives and beneficiaries; the overly frequent rotation of officials leading to the discontinuity of projects; lack of accountability and credible measurements; and the gap between the agricultural information services provided and local needs due to the central planning. Based on these findings, the authors imply that designing effective and credible measurements is imperative to reduce waste and evaluate officials fairly. This design should focus on the product development and the product evaluation, in which analysing in depth on users to identify: specific types of information they need, how farmers use these services, and how users determine and adopt decisions. They also call for writing rural informatization into the telecommunication law as a type of universal service.

From a different angle to look at the universal service policy in China, Jayakar & Liu (2014) base on the dimensions of universal service like territory, demography, and layer to make a comparison between universal service policies in China and India. Jayakar & Liu (2014) argue that the execution of China's and India's universal service policies is as the quid pro quo for the popular endorsement of state legitimacy. Allocating achievements of economic growth as well as supporting for the development of society and economy in rural areas via launching the universal service polices, the Chinese government wants to legitimize their position. Affordable and equitable telecommunications service for all Chinese people is of significance to the stability and avoiding the political dissent (Jayakar & Liu, 2014; Ting & Yi, 2013).

Furthermore, broadband and informatization will enable the development of society and economy, and reduce the imbalance between urban and rural areas.

Broadband development policies in South Korea

South Korea has been the leader of the penetration of broadband in whole the world for many years in which the Korean government has played a critical role (C. Lee & Chan-Olmsted, 2004). In 1993, South Korea formulated a set of national policies on broadband internet information infrastructure (the Korean Information Infrastructure Plan-KII and the Cyber Building Certification system) to foster broadband roll out. Accordingly, on approaches to the supply side, the government introduced a wide range of telecommunication policies for competition, based on deregulation and market principles (Lee et al., 2003) such as: licencing to telecommunications operators to provide local, distance calls and high speed internet access aiming to facilitate competition; partial subsiding to facility-based service carriers to construct the broadband networks; implementing the hands-off policy to deregulate the registration procedure; and promoting the broadband access platform in apartments and new buildings.

On the other hand, in terms of the demand side, South Korea also stimulated the awareness of people about the benefit of broadband access by forming the Ten million people internet education project. In line with the policy, the groups of housewives, the elderly, military personnel, farmers, and low-income families would be trained about the IT literacy and internet literacy programs. Particularly, housewives were targeted as a main sector due to their great influence on purchasing in a household. The reasonable capacity of the high-speed internet access, with various services and applications of broadband and the affordability attributed to boom of the demand of broadband access in South Korea.

Consequently, the average annual growth rate of high speed internet in South Korea, in period 1999 - 2001, reached 30 percent (C. Lee & Chan-Olmsted, 2004). Moreover, in February 2001 there were 57.3 percent of Korean Internet home users accessing via broadband connections, whereas in the second country (the United States) this was only 11.1% (Lee et al., 2003).

CHAPTER 3. UNIVERSAL SERVICE IN VIETNAM AND THEIR PROBLEMS

This chapter introduces universal service in Vietnam and discusses problems about universal service that motivate the author to do this research. Before that, an overview of the telecommunications market in Vietnam is illustrated.

3.1. UNIVERSAL SERVICE IN VIETNAM

3.1.1. AN OVERVIEW OF THE VIETNAM TELECOMMUNICATIONS MARKET

3.1.1.1 Policy makers and Regulator

As described in their studies, Thai, Falch, & Williams (n.d., 2016) introduced briefly an overview of the Vietnam telecommunications market. Vietnam reformed and liberalized its telecommunications market in 1994 as it separated the regulatory and business function from the Department General of Post and Telecommunications - DGPT (predecessor of MIC today). Consequently, DGPT was responsible for making telecommunications and post policies and regulations, and Vietnam Posts and Telecommunications Corporation (VNPT), a state-owned company was in charge of doing business in the telecommunications and post field.

The Vietnam telecommunications market is governed by MIC. MIC is responsible for both making policies and regulations as well as drafting laws and ordinances on: posts; telecommunications and Internet; radio frequency; information technology; electronics; broadcasting and management of public services; and press and publishing. At the provincial level, each province has one DIC who has responsibility similar to MIC, however they only govern within their local. In Vietnam, there is also a national telecommunications authority, the so-called Viet Nam Telecommunications Authority (VNTA). They perform regulatory activities including advice on management of the telecommunications sector on a national scale (Tuan, 2011).

3.1.1.2 Telecom providers and market shares

In 1995, the government ended the monopoly of VNPT as it granted two new entrants (Viettel and SPT) licenses to provide fixed local, domestic long distance, international long distance, leased line, and mobile services (Ha et al., 2005). In 1997, the government licensed five telecom providers to provide internet services (VNPT, Viettel, SPT, and two other state-owned companies FPT and Netnam. A few years later SPT, FPT, and Netnam have changed into joint stock companies). In 2000,

Vishipel was licensed to provide marine (Inmarsat) telecom services and radio communication services for ships at seas. One year later in 2001, ETC (then renamed EVN), a state-owned company belonging to the Vietnam Electricity Corporation, was licensed to provide almost all telecom services (fixed local, domestic and international long distance, leased line, mobile, and VOIP services) (Dung, 2012). Since 2003 to 2008, the government granted three foreign operators licences to construct and provide mobile telephone services (under the Business Cooperation Contract[8] form, now converted to a joint venture form). They were SK telecom - South Korea, Hutchison Telecom - HongKong, and Vimpelcom - Russia. However, until now just one cooperation has still run their business (Vietnammobile/Hutchison Telecom), the two others sold all their stakes to domestic partners.

Although promoting competition and inviting foreign investment, the telecommunications market is still dominated by state-owned operators.

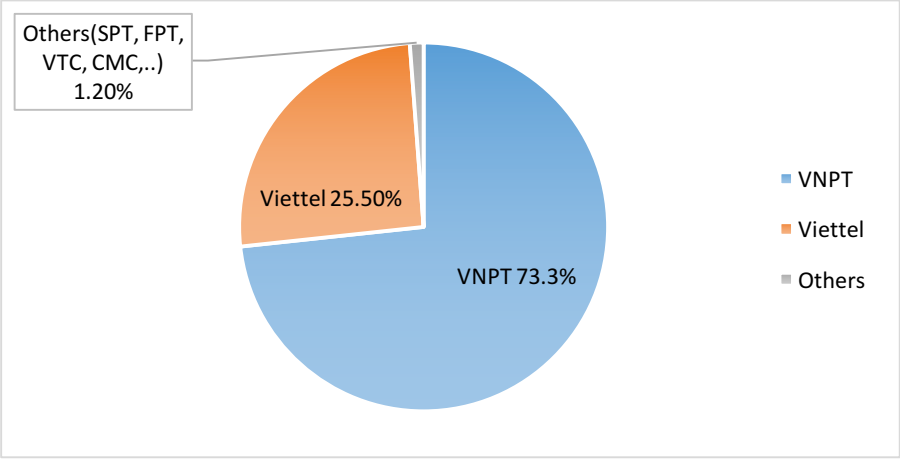

Figure 3: Fixed telephone market shares in 2016

Source: Information and Data on Information and Communication in 2017, Ministry of Information and Communications (MIC, 2017)

[8] BCC is a form of investment signed between investors for business cooperation with profit-sharing or product-sharing, without creating a legal entity.

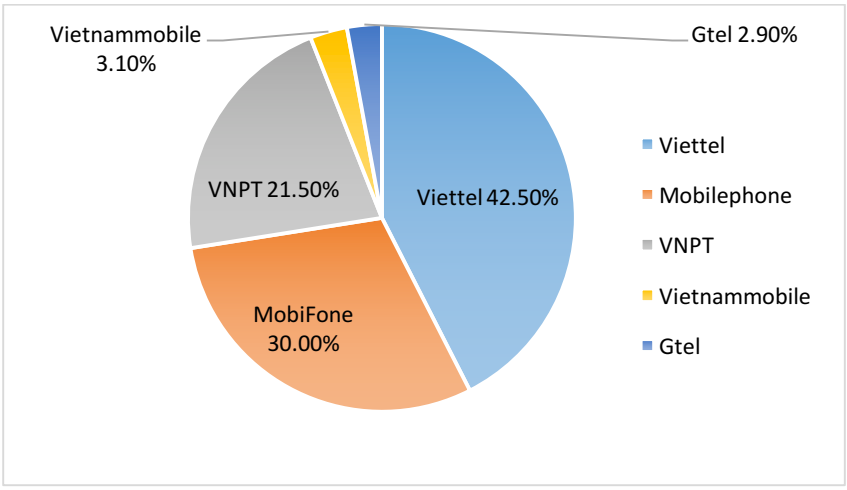

Figure 4: Mobile telephone (2G) market shares in 2016
Source: MIC, 2017

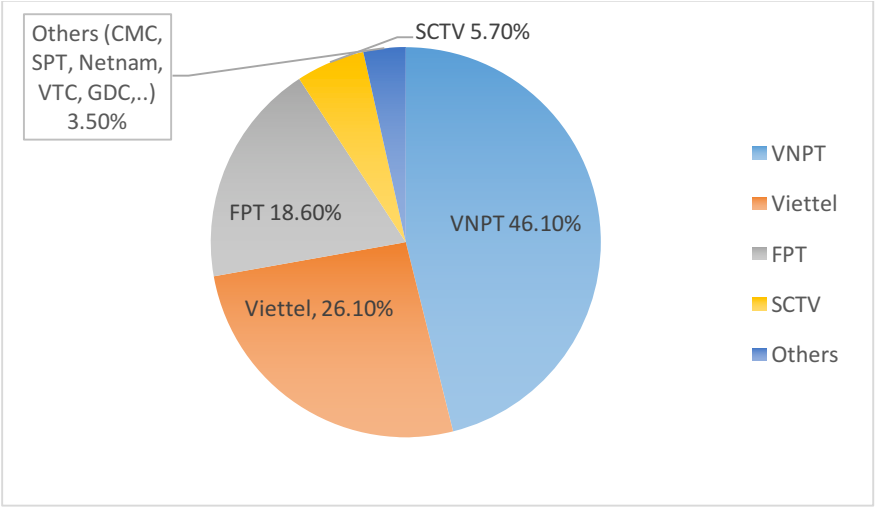

Figure 5: Fixed broadband internet market shares in 2016

Source: MIC, 2017

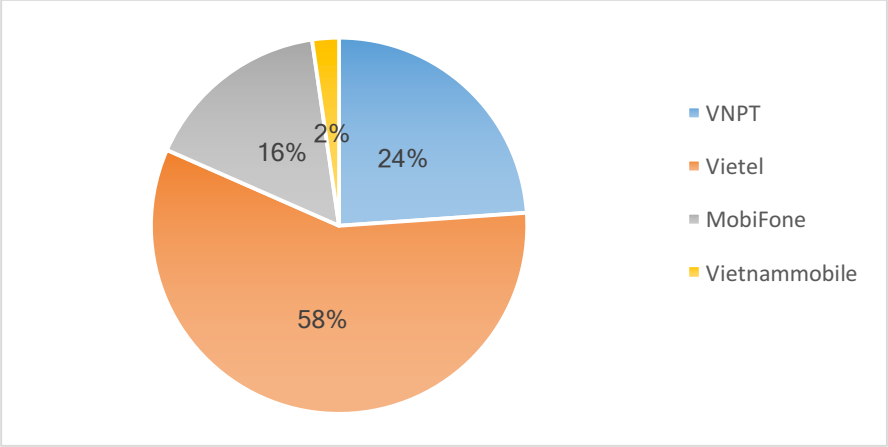

Figure 6: Mobile broadband internet (3G) market shares in 2016

Source: MIC, 2017

As Figures 3-6 show that, VNPT and Viettel controlled approximately 99% of the fixed-line market. Three companies Viettel, VNPT, and MobiFone controlled approximately 94% of the mobile market (MobiFone and VinaPhone were subsidiaries of VNPT. In 2014, MobiFone was split up from VNPT, and became an autonomous mobile telephone operator). Both companies VNPT and Viettel also accounted of around 72% of the fixed-broadband market and around 98% of the mobile broadband market. Only FPT, a joint stock company could compete with them in the fixed broadband internet market. Here, FPT made up around 19% of this market in 2016. The joint venture company Vietnammobile (with Huchison Telecom) just accounted for approximately 3,1% in the mobile telephone market, and around 2% in the mobile broadband market in 2016.

3.1.1.3 Network infrastructure technologies

In Vietnam, ADSL technology dominates in the fixed broadband Internet market. Fibre networks (FTTH) and cable TV broadband (CATV) also exist but just accounted for approximately 10% of total fixed broadband subscriptions in 2013 (MIC, 2014). Regarding the mobile broadband Internet market, 3G technology still takes a major account of this market. Although, the government allowed to launch a pilot WiMAX project in 2006, and granted trial LTE licenses to five operators (VNPT, Viettel, FPT Telecom, CMC, and VTC) in 2010 (Tuan, 2011), till 2016 the government licensed for operator (MobiFone, VNPT, Viettel, and GTel) to launch 4G technology. Until now, they have still run trial the 4G technology.

3.1.2. UNIVERSAL SERVICE POLICIES

As Thai, Falch, & Williams, (n.d., 2016) point out in their studies. Vietnam initially considered the development of universal service in 1995 as they reformed the telecommunications market, however, the definition of universal service was quite simple and no specific objective was addressed[9]. The regulatory framework for universal service has been gradually built up since Vietnam signed the Bilateral Trade Agreement with the United States in 2000 (Lam, 2013 : 154), and joined into the World Trade Organization (WTO) and General Agreement on Trade in Services (GATS) on basic telecommunications (Ha et al., 2005). In 2005, the government had to give up the price support regime and look for other tools to finance universal service (by setting up VTF and introducing the 'Program on the Provision of Public telecommunications Service until 2010' - the Program 74).

The Program 74 was carried out within five years, from 2005 to 2010. The total budget was approximately 210 million euros, mainly collected from a share of the annual revenue of incumbent providers. The main targets of the Program 74 were that the tele-density should reach 5 phone sets per 100 inhabitants in areas (communes) with a tele-density below 2.5 sets per 100 inhabitants (so-called the universal service areas), all communes throughout the country should have at least one tele-center; 70% of communes in the whole country should have at least one public internet access center; and all citizens should have access to the emergency telephone services. This was the first time, Vietnam introduced a clear definition of universal service. Accordingly, universal service, the so-called public telecommunications service in Vietnam, included universal and mandatory telecommunications service. In which, the universal telecommunications service was standard telephone service and standard internet access service; and the mandatory telecommunications service was emergency calls (such as medical first aid, social order and security incidents, fire extinguishment, telecommunications service in searching and rescuing, and preventing and fighting of natural disasters), and fixed telephone number inquiries. The Program 74 benefited all inhabitants and households that either got their own connection or used the services offered at public telecommunications service centers. All beneficiaries living in universal service areas was eligible to receive subsidies from the Program 74.

The Program 74 achieved success: the tele-density reached 16 lines per 100 inhabitants (increased threefold from the initial objective); the penetration rate of internet was 0.32% in 2009 (increased almost twofold compared to that in 2004); 97% of communes in the whole country had at least one public telephone center; and all

[9] Article 13 section 2 of the Degree 51/CP only regulated that: VNPT enables the provision of basic telecommunication services in whole country (including the isolated and mountainous areas).

citizens were free to have access to the mandatory service (Report on the Implementation of The Program 74 - Report 74). However, some objectives of the Program 74 were not met. Merely 55% of communes throughout the country had one public internet access center and only 40% of households in universal service areas had a fixed-line (Report 74). The type of universal service was still limited as majority only had dial up internet access (Decision 43 issued on November 2nd, 2006 by MIC). The provision of universal service was mainly implemented via form of 'order place' or 'plan assignment' not by bidding/auction regimes to select the lowest subsidy telecom providers offer (Circular 05/2006/TT-BBCVT).

Subsequently, in 2011 the 'Program on Provision of Universal Service from 2011 to 2015' was already approved by the Prime Minister and would have been deployed in five years, from 2011 to 2015 (Decision 1643, 2011). However, this Program was delayed and reformulated due to lack of consideration of technology development as well as incompatibility with existing ICT infrastructure and other national policies of rural development (the Project on Establishing the Program 1168).

After some years, on July 24th, 2015, the Prime Minister issued another program: the 'Program on provision of Universal Service until 2020' (here in after called Program 1168), the total budget is around 440 million euros collected from a share of the annual revenue of incumbent providers[10]. The Program 1168 is a continuity from the Program 74. The Program 1168 has been divided into five small plans: Broadband Connection Plan, Emergency Connection Plan, Public Connection Plan, Institutes Connection Plan, and Digital Broadcast Connection Plan. This Program is now being implemented. Table 1 below depicts some main contents of the Program 1168.

[10] 1.5% of the revenue from all telecommunication services (facility-owned operators provide telecommunication services); 1.5% of the revenue from international one-way back telephone service (facility-unowned operators provide the services) (Decision 1168). Available at: http://cntt.moj.gov.vn/qt/tintuc/Lists/VanBanHuongDan/Attachments/48/1168.signed.pdf

	Main objective	**Beneficiary**	**Funding sources**
1. Broadband Connection Plan	Roll-out of mobile and Fixed Broadband Network	Facility based service Providers	Government and facility-based service Providers
2. Emergency Connection Plan	Accessible to emergency calls	End users	Government
3. Public Connection Plan	Accessible to public telecom centres, subscribe to fixed/mobile telephone services	End users, poor households, and fishermen	Government and Telecom Providers
4. Institutes Connection Plan	Accessible to broadband internet	Schools, hospitals, and Commune People's Committees	Government
5. Digital Broadcast Connection Plan	Accessible to broadcast	Poor households	Government

Table 1: An overview of the Program on Provision of Universal Service until 2020

The Program 1168 has some differences from the Program 74 as following:

- Scope: The Program 1168 has included some other telecommunications service in their scope of subsidies, such as: fixed broadband internet services and mobile telephone services.

- Beneficiaries: They have targeted on specific groups to provide subsidies (e.g. poor households, fishermen, and schools, hospitals, and commune people's committees) rather than all households living in areas with a tele-density below 2.5 sets per 100 inhabitants as the Program 74 did.

- Infrastructure: This Program has spent a major budget to develop infrastructure networks (around 70% of the total budget).

- Financial contributions: Facility-owned operators now pay 1.5% of all their telecommunications services revenue to contribute into universal service fund - VTF (no separation into specific telecommunication services as the Program 74 did. The Program 1168 distinguishes between facility-owned operators and facility-unowned operators in order to collect financial contributions).

Thai, Falch, & Salakpi (2016) show that the Program 1168 focuses much on the supply side, less on the demand side, and lack of plans promoting demand, such as plans to

improve the knowledge and ICT skills of users or develop applications in education, agriculture, and health information in local languages.

3.2. DISCUSSION ON PROBLEMS

Strengthening the development of society and economy in rural and isolated areas in Vietnam is one of the most critical tasks that the CPV and the government give a priority on their agenda. The universal service programs have made a contribution on closing the digital divide in these areas. However, these programs have also revealed many unsettled issues, such as: the gap between the universal service provided with users' needs; the loose interactions between the central government (MIC) and provincial governments (DICs); lack of involvement of private sectors or social civil. The approach implemented was the top-down based on the administration regime, not based on market principles. The initiatives to enhance universal service have mainly focused on the supply side, lack of initiatives to promote the demand side.

In other words, the government has not adequately considered important factors in building up the Programs, such as the coordination among the players in implementing the Programs (the national government, local governments, telecom providers, users and other relevant bodies), their motivation/interests, or the appropriateness between needs of rural users with subsidized services. As a result, in the first program - the Program 74, the government often provided the players with guidelines, even though these guidelines just introduced had to be modified (that means the modifications influenced the stability of the Program) or some objectives of the Program set up were not realistic. And the second program - the Program 1168 has relied much on supply side, has not yet considered on initiatives to increase knowledge and skills of rural users.

On the other hand, the change of technology has dramatically influenced on scope and scale of universality. The emergence of high speed broadband networks is, today, being anticipated to facilitate access to information carried over the high speed networks (Msimang, 2012). Many countries are taking into account the role of broadband in universal service policies (Calvo, 2012). Hence, doing research and investigating approaches to enhance universal service in rural areas are becoming vital in Vietnam.

CHAPTER 4. METHODOLOGY

This chapter introduces methodology and an analytical framework that directs the whole PhD project to do research. Next, reflections of these theories adopted for the four appended papers are provided to justify how these theories were selected, and what could they contribute to the analysis of each paper as well as to the main thesis. Finally, the chapter explains how the author gathered data, and what types of the research method the thesis follows.

4.1. RESEARCH FRAMEWORK

The thesis looks at universal service in Vietnam in order to provide the central government as well as some other developing nations with policy recommendations to enhance universal service. In other words, the thesis's outcomes will be suggestions to formulate regulations/policies to reinforce universal service. According to Stigler (1971), regulations are made by the State to improve benefits of economic groups or redistribute welfare in society. Moreover, economic and social activities have nowadays increasingly moved onto broadband networks, developing countries have been implementing their own broadband plans to realize the benefits that broadband can bring to their country and citizens (Kelly & Rossotto, 2012). This thesis thus looks at regulations under social and market perspectives in order to get insights into how the two perspectives influenced the formulation and implementation of universal service policies in Vietnam. Based on that, policy recommendation will be drawn. With the market perspective, the author looks at the supply-demand side and actors participating in universal service policies[11]. With the social perspective, the author examines relations, positions, structures, and behaviour of the actors[12]. The thesis employs various types of theory to analyse the universal service in Vietnam. As Patton (1999) calls this method a theory triangulation that uses different theoretical perspectives to look at the same data to understand how findings are affected by different assumptions and fundamental premises.

[11] Callon (1998, p:1) points out that 'the market denotes the abstract mechanisms whereby supply and demand confront each other and adjust themselves in search of a compromise'.

[12] A society is a group of people involved in persistent social interaction, or a large social group sharing the same geographical or social territory, typically subject to the same political authority and dominant cultural expectations (Wikipedia, available at: https://en.wikipedia.org/wiki/Society)

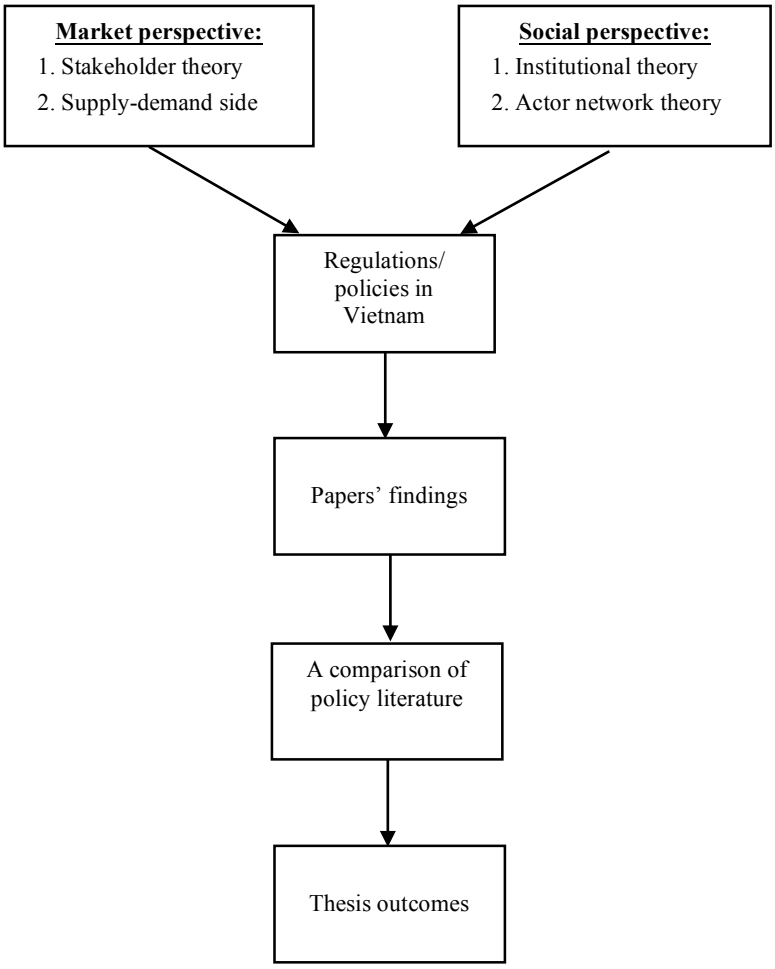

Figure 7: Research framework

As shown in Figure 7, the thesis analyses the universal service policies in Vietnam under social and market perspectives. From the social perspective, the author recruits Institutional Theory and Actor Network Theory. From the market perspective, the author applies Stakeholder Theory and Supply - Demand Side. Each one paper applied a theoretical framework (that was constructed by using these theories) to investigate and clarify market and social factors influencing the universal service policies in Vietnam. Recommendations were also provided in each paper. Then, the thesis bases on the findings of the four papers, and cooperates with the literature (in Chapter 2) on universal service/broadband development policies from other nations to produce the

thesis outcomes. The following sections explain in detail reflections on these theories in each paper and how they were analysed and data were collected.

4.2. CASE STUDY ANALYSIS

As Benbasat, Goldstein, & Mead (1987) point out that one of the reasons to apply case study research is due to the appropriateness to explore an area in which few previous studies have been carried out. This is particularly true for the case of Vietnam when little research on universal service has been undertaken. In this sense, this thesis is a case study with empirical data from Vietnam. This case study explores of how the universal service policies have been implemented in Vietnam. Based on investigating which factors influenced the implementation of the policies, recommendations for the Vietnamese government will be drawn to enhance universal service.

According to Yin (2009), a case study examines contemporary events in its natural setting, employing multiple methods of data collection (like documents, interviews, and observations) to gather information from one or a few entities (people, groups, or organizations) (Benbasat et al., 1987). In other words, a case study helps researchers get deep insights into important contextual conditions that closely related to the phenomenon of the study with using multiple sources to collect data for analysing (Yin, 2009).

Case studies are applied to answer to questions of how and why things happen, allowing the investigations of contextual realities and the differences between what was planned and what actually happened (Noor, 2008). Yin (2009) indicates that there are three types of case study research: exploratory, descriptive, and explanatory method. Exploratory case study is used to explore those situations in which the intervention being evaluated has no clear. Descriptive case study is used to describe a phenomenon when it occurred. Explanatory research is used to study the presumed causal links in real-life interventions (Baxter & Jack, 2008; Noor, 2008; Yin, 2009).

Case study research includes both single or multiple case studies. In which, multiple case studies enable researchers to explore differences within and between cases. The goal is to replicate findings across cases. Because comparisons will be drawn, it is imperative that the cases are chosen carefully so that the researcher can predict similar results across cases (Baxter & Jack, 2008)

Case studies can be used either in qualitative or/and quantitative approaches, even though it is considered among the array of qualitative research. Moreover, according to Yin (2009), case studies do not need to always include the direct and detailed observational evidence.

In the present research, Vietnam was selected as a case study on universal service (a phenomenon). Although, integrating into the global economy and opening the telecommunications market since 1995, a little research on universal service in telecommunications in Vietnam has been undertaken. This research gathered data from various sources, like documents, interviews, and websites, and applied a qualitative analysis to get insights into the phenomenon. By exploring the question of how universal service policies have been implemented in Vietnam and which factors influenced the implementation of the policies, recommendations will be drawn to enhance universal service in Vietnam.

4.3. REFLECTIONS OF THE THEORIES ON EACH PAPER

4.3.1. PAPER 1: Institutional theory

The first paper 'Universal service in Vietnam: An institutional approach' applied the four-layer model 'Levels of institutional analysis' form Koppenjan & Groenewegen (2005) to look at the 'Program on provision of universal service until 2010' (the Program 74) in Vietnam. This model was designed by analysing the role of institutions in the context of complex technological systems. In their research, they define institutions as 'a set of rules that regulates the interaction between parties involved in the functioning of a (technological) system'. They argue that in the design/redesign of complex technological systems, it is necessary to look not only on technological challenges involved, but also to analyse the institutional structure that coordinates the positions, relations, and behaviour of the parties in the system. This will make these systems more stable and reduce the transaction costs between parties. The application of the Koppenjan & Groenewegen's four-layer model aimed to explain how universal service in Vietnam was designed and which main factors influenced it. In other words, institutional theory looks at the processes and mechanisms that form structures, rules, and routines in order to explain or shape human interaction and social behaviour (North, 1990; W. R. Scott, 2005).

Basically, Koppenjan & Groenewegen (2005) design this model is based on the Williamson's four-layer model. In his research, Williamson, (1998, 2000) illustrates the establishment of the new institutional economics via four layers: Level 1 - Embeddedness: Informal institutions, like: customs, traditions, norms, religion; Level 2 - Institutional environment: Formal rules of the game, like: property (polity, judiciary, bureaucracy); Level 3 - Governance: Play of the game, like: contract (aligning governance structure with transactions); Level 4 - Resource allocation and employment (prices and quantities, incentive alignment). In this model, the higher level imposes constrains on the immediate lower, and the lower level gives feedback to higher levels. Basically, in this model he explains economic relations/transactions among actors are implemented via contracts that are devised to govern the transactions (level 3). As the transactions become more complex, the cost of negotiating and

policing contracts increases. It is necessary to construct contract laws and mechanisms, such as property rights, organizational hierarchies, political regimes (level 2) - in order to manage and enforce the transactions. However, the construction of rules of the game is affected by customs, traditions, norms, and religion (level 1).

Also, looking at the new institutional economics, Coase (1998) argues that the productivity of an economic system depends on the specialization or transaction costs, in turn the transaction costs depend the institution of a country, such as: its legal system, its political system, its social system, its educational system, its culture, and so on. Hence, the lower the transaction cost the higher the productive efficiency of institutions (Xia & Lu, 2008).

According to North (1990:3) institutions are as 'the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction'. Institutions are formed to guide human beings into interaction and to reduce uncertainty in their daily life (North, 1990:6). North (1990:35) also asserts that a model of institutions has three characteristics: informal constrains, formal constrains, and enforcement. Informal constraints are codes of conducts, norms of behaviour, and conventions and are a part of culture. Formal constraints are formal rules, from constitutions, to statute and laws, to bylaws, and to individual contracts. Formal rules are created and evolved along with increasingly complex societies, and can complement and increase the effectiveness of informal constrains (North, 1990). Enforcement deals with how effectively parties are enforced to obey contracts or agreements. More importantly, North (1990:53) concludes that to develop an institution, we should put them together to look at. A mixture of these three factors will define the choice set and result in outcomes.

4.3.2. PAPER 2: Stakeholders theory

The second paper 'Universal service in Vietnam: The role of government' applied a stakeholder framework of Papazafeiropoulou and Pouloudi (2000) to identify stakeholders and their relationships in implementing a universal service policy in Vietnam. This framework is devised by basing on the categorization of King et al. (1994) on government intervention in IT innovation, the categorization of the environment layer of Damsgaard (1996) (Choudrie & Papazafeiropoulou, 2003), and the stakeholder theory in order to analyse the roles of stakeholders in the electronic commerce market. They recognize five groups of stakeholders in the electronic commerce market: The national government; International organizations; Policy intermediaries; Companies; and Customers/citizens. They also identify the relations among these stakeholders via six national strategies: Knowledge building, Knowledge deployment, Subsidy, Mobilization, Innovation directive, and Standard setting.

The stakeholder theory introduced by R. Edward Freeman has nowadays become a central component of management theory (Harrison & Freeman, 1999; Mitchell, Wood, & Agle, 1997). According to Freeman (2010, p.46), a stakeholder is 'any group or individual who can affect or is affected by the achievement of the organization's objectives'. To manage organizations effectively, it is indispensable to take stakeholders into account in a systematic fashion (Freeman, 2010). However, this theory is applied and explained in various ways with diverse and often contradictory evidence and arguments (Donaldson & Preston, 1995). To make this theory more clear, Donaldson and Preston (1995) categorize it into three distinct types, as descriptive/empirical, instrumental, and normative in which the normative is fundamental. Mitchell et al. (1997) categorise stakeholders by their attributes, like: power, legitimacy, and urgency to generate a typology of stakeholders including: domain stakeholder, discretionary stakeholder, demanding stakeholder, dominant stakeholder, dangerous stakeholder, dependent stakeholder, definitive stakeholder, and non-stakeholder. They call this the 'theory of stakeholder identification and salience'.

Although, stakeholder theory is primarily applied for analysis of private companies, the insights can be applied in part in public sector settings as well, particularly within e-government services (Scholl, 2001). Based on the stakeholder theory by Freeman, many scholars have designed approaches/frameworks to explore views/roles of stakeholders in inter-organizational systems and in information systems (Papazafeiropoulou & Pouloudi, 2000; Pouloudi & Whitley, 1997). More practically, various researchers have applied this theory to analyze the role of stakeholders in the implementation of policies, or in the running of a system. Choudrie and Papazafeiropoulou (2003) apply the stakeholder theory to examine strategies used by the government in diffusing broadband take-up in South Korea. Luk (2009) and Scott et al. (2004) use this theory to look at the success and failure of e-government systems in Hong Kong and Ireland respectively. Zhang, Dawes and Sarkis (2005) explore stakeholders' potential benefits of and barriers to inter-organizational knowledge sharing in an e-government setting.

Studying attitudes and expectations of multiple stakeholders as well as the involvement of the widest players might reduce conflicts and increase the rate of success in implementation of information system (Papazafeiropoulou & Pouloudi, 2000; M. Scott et al., 2004). Hence, application of this theory as a tool to identify and to analyse the impact of stakeholders in the field of ICT is useful.

4.3.3. PAPER 3: Actor Network theory

The third paper 'Examining actors into boosting the provision of universal service in the Vietnamese context' applied the actor network analysis framework of Gao (2005) to look at a universal service program in Vietnam to investigate motivations and

relationships between human actors and non-human actors in the formulation and implementation the Project 'Improving ability of using computers and public internet access in Vietnam' (the BMGF-VN project) in the context of boosting the development of ICT in countryside in Vietnam. Based on these findings from the analysis, recommendations will be provided for Vietnam in terms of who should be involved in the formulation and implementation of universal service policy.

The Actor-Network Theory framework is created by Gao (2005) to analyse the formulation and implementation of strategies for the development of telecommunications market in China. In this framework, he considers the telecommunications market as a non-human actor and defines the public and society, the state, and the operators as the groups of human-actors representing the social interests in the telecommunication area. His analysis shows that how actors translated and inscribed their interests into the strategy formulation for the development of telecommunications market in China. He also posits that it is important to take contextual analysis into account to capture the strength and flexibility of actors' interests and their power to influence an inscription.

Actor-Network Theory (ANT) was developed by Michel Callon and Bruno Latour (Walsham, 1997). It provides a framework to explain the process of technology adoption (McBride, 2003). Walsham (1997) points out that ANT examines the motivations and actions of actors within the social - technical network. Actors here are not just humans (people or organizations) but also non-humans (software, computer and communications hardware, and infrastructure standards) (Walsham, 1997). Actor-network can be technical or social arrangements where actors' interests are translated into a network (Monteiro & Hanseth, 1996). According to Walsham (1997) 'successful networks of aligned interests are created through the enrolment of a sufficient body of allies, and the translation of their interests so that they are willing to participate in particular ways of thinking and acting which maintain the network'.

In ANT, 'translation' and 'inscription' are of key concepts for understanding process of aligning interests of actors to form an actor network Walsham (1997). Translation implies that actors align interests of other actors with their own into a network. An inscription is the result of the translation of one's interest into material form (Callon, 1991). In general, any component of the heterogeneous network of skills, practices, artefacts, institutional arrangements, texts and contracts establishing a social order may be the material for inscriptions (Monteiro & Hanseth, 1996).

ANT has been widely used to analyse the process of technology implementation. However, a few researchers have analysed the formulation and implementation of ICT policies under an ANT lens (Gao, 2005; Shin, 2010; Shin & Lee, 2011). Shin & Lee (2011) base on the ANT framework of (Gao, 2005) to analyse the Korea's strategy for the development of the ubiquitous city (u-city). The findings show that the Korean

government should consider not only non-human actors or technological factors, but also human actors or social/cultural issues in the process of constructing social-practice infrastructure. In other words, they argue that the clear understanding of how networked applications and scientific inquiry have been transformed by pervasive infrastructure is also indispensable. Shin (2010) employs ANT to analyse policy-making process of the convergence in terms of politics and regulation, and examines how actors' interests are aligned and coordinated in the policymaking process of convergence in Korea. He shows that the actor-network around convergence is not effectively stabilized, as the politics of convergence is complex and marked by paradoxical features. Hence, he suggests the Korean government should create a friendly regulatory environment to the growth, development, and collaboration of actors across all spectrums, including technology, infrastructure, and content.

4.3.4. PAPER 4: Supply-Demand Side

The fourth paper 'Universal service policy in Vietnam: A supply-demand perspective' applied the framework from King et al (1994) to look at the 'Program on provision of universal service until 2020' (the Program 1168) in Vietnam in order to investigate which initiatives implemented in Vietnam. Furthermore, the paper made a comparison of national policies between Vietnam and two nations (South Korea and Japan) to evaluate the differences of the policy being implemented in Vietnam. Some lessons for Vietnam and developing countries in building up policies will be drawn. This framework is devised by combining perspective of supply and demand theory, and power of an institution (influence and regulation). Supply-push comes from the production of the innovative product or process itself. Demand-pull refers to the willingness of potential users to use the innovation (King et al., 1994). In this framework, King et al., (1994) suggest six actions institutions can take in order to promote the diffusion of IT. Each type of these actions can address either the demand or the supply side.

		Supply-Push	Demand-Pull
Influence		Knowledge building Knowledge deployment Subsidy Innovation directive	Knowledge deployment Subsidy Mobilization
		I	II
Regulation		III Knowledge deployment Subsidy Standards Innovation directive	IV Subsidy Standards Innovation directive

Table 2: Dimensions of Institutional Intervention (King et al., 1994)

'Knowledge building' is undertaken to provide the scientific and technical knowledge base required to produce and exploit innovations, e.g. funding of universities and research;

'Knowledge deployment' is to stimulate the dissemination of new knowledge;

A 'subsidy' is support provided to innovators and users to pay the unavoidable costs or risks related to the innovation process and the diffusion of usage;

'Mobilization' basically means the encouragement of decentralized actors and organizations to think in a particular way with respect to an innovation, e.g. promotional and awareness programs or advertisement to support the use of innovations;

'Standard setting' is a form of regulation aimed at constraining options of decentralized actors and organizations in line with larger social or institutional objectives;

'Innovation directive' is a command to produce innovations, to use them, or to engage in some activity that will specifically facilitate production and/or use.

4.4. DATA COLLECTION AND ANALYSIS

This is a qualitative research that data was gathered via primary (interviews) and secondary documents. The combination of two data sources increases the overall credibility of the data, reduces systematic bias in the data, contributes to validity of findings, and eliminates overlapping areas (Creswell & Miller, 2000; Patton, 1999).

The secondary data used for the four appended papers was mainly collected from Vietnamese Ministry of Information and Communications (MIC), the Vietnam Public Utility Telecommunications Service Fund (VTF), and some data from ITU and the World Bank. The documentary analysis is appropriate to examine public and private documents, and 'enables a researcher to obtain the language and words of participants at a convenient time' (Creswell, 2009). A lot of documents were collected from the MIC's website (http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.). Because some documents have not been published publicly (e.g. the Project on Establishing Vietnam Public Utility Telecommunications Service Fund, and Report on the Implementation of The Program 74), the researcher gathered them via his private relationships.

Moreover, to triangulate the secondary data, the author also conducted interviews with officials working in MIC, DICs, VTF, telecom providers, and staff working on public libraries and public telecom centres. All these interviewees have involved in the formulation and/or the implementation the Program 74, the Program 1168, and the BMGF-VN project. The interviews were conducted at two periods, in 2015 and in 2016/2017 (the list of interviewees is provided in Appendix 1). These were semi-structured interviews carried out face to face with each one interviewee (except one interview that was conducted with two people, one was a director and the other was a Liberian of the Kesach Library). These interviewees usually lasted from one to two hours. Open-ended questions were used to promote further discussions about the topics. Some information collected that was not clear or insufficient to analyse was to be sent back to the interviewees by email for verification. All these interviews were written down and almost recorded for ensuring validity and reliability of the data. In addition, available secondary data (e.g. specialty newspapers) have been applied as well.

The thesis applies a qualitative document/content analysis to analyse the data collected. According to Bowen (2009), document analysis involves skimming (superficial examination), reading (thorough examination), and interpretation. Document analysis includes content analysis and thematic analysis. Content analysis is the process of organising information into categories related to the central questions of the research (Bowen, 2009). Content analysis focuses on the characteristics of language as communication with attention to the content or contextual meaning of the text. Text data might be in verbal, print, or electronic form and collected from

narrative responses, open-ended survey questions, interviews, focus groups, observations, or print media such as articles, books, or manuals (Hsieh & Shannon, 2005). Thematic analysis is a form of recognising and categorising the data into themes for analysis. Researchers in the process take a closer look at the selected data to explore themes relating to a phenomenon (Bowen, 2009).

In the thesis, the data collected and analysed depends on the research questions of each paper appended, for instances: the data relating to stakeholders (data relating to actors implementing provision of universal service), or the data regarding institution (institutional factors involving universal service). The research questions were addressed first before the data was gather and analysed. The interview and the documentary data were read carefully and highlighted to capture the meanings relating to the research questions. Both the data sources (from the interviews and the secondary data) were collected and analysed simultaneously by a content analysis and thematic analysis. The findings of the analyses were complemented and triangulated each other to increase the credibility and reduce the bias of the data.

4.5. RESEARCH METHODS

The thesis is a cross-disciplinary research that applied multiple theories and used a qualitative document/content analysis to analyse universal service policies in Vietnam. As Patton (1999) calls this method a theory triangulation that uses different theoretical perspectives to look at the same data to understand how findings are affected by different assumptions and fundamental premises.

As such, in this thesis, both the Paper 1 and the Paper 2 analysed the 'Program on provision of universal service until 2010' (the Program 74) based on the same data source (data collected from the interviews in 2015, and the secondary documents such as: Decision 74, Curriculum 05, and Report on the Program 74). However, the two papers applied two different theories. Paper 1 applied the Institutional Theory to explain how universal service policies in Vietnam was designed and which main factors influenced them. Paper 2 applied the Stakeholder Theory to identify who participated in deploying universal service policies, their relationships or which initiatives implemented in Vietnam. Meanwhile, Paper 3 and Paper 4 employed two different theories with two different data sources. Paper 3 applied the Actor Network Theory to look at the BMGF-VN project to investigate motivations and relationships between human actors and non-human actors in formulation and implementation the Project. Paper 4 employed the Supply-Demand Side to analyse the Program 1168 to investigate which strategies are being deployed in Vietnam, how different are they compared with those from Japan and South Korea. Finally, this thesis bases on the findings of the four appended papers and cooperates with the literature on universal service/broadband development policies from other nations (in Chapter 2) in order to produce thesis outcomes.

According to Elo & Kyngäs (2008), deductive content analysis (or directed content analysis as Hsieh & Shannon (2005) refer to in their research) is used to test or validate a theoretical framework or theory. Based on existing theories or researches, researchers can analyse and find out answers to the research questions. The findings from deductive content analysis provide evidence to support or against for a theory. (Hsieh & Shannon, 2005). Apparently, the thesis has applied a deductive content approach that recruited various theoretical frameworks and examined these frameworks with the data collected from Vietnam. These theoretical frameworks helped the author collect data and provided structures to analyse a phenomenon (universal service). Based on the analyses, these frameworks could be confirmed or rejected. Moreover, policy recommendations were then provided.

On the other side, in terms of the philosophy of science. The research philosophy refers to important assumptions about the way in which you view the world. These assumptions will underpin the research strategy and the methods (Saunders, Lewis, & Thornhill, 2009). According to Walliman (2006), the nature of social research is based around the philosophical aspects of epistemology and ontology. Epistemology concerns with the nature of knowledge claims (Walsham, 1995) or how we know things , and includes positivism, interpretivism, and realism (Walliman, 2006). Meanwhile, ontology concerns with the nature of reality (Walsham, 1995) or what there exists to be investigated, and includes objectivism and constructivism (Walliman, 2006). This thesis has used theories to analyse and interpret a phenomenon (universal service policies) in Vietnam to get it insight (like how the policies were formulated and implemented, which factors influenced them, and what relationships among them) as well as to provide the government with policy suggestions. Thus, it could be said that the epistemology of this research is an interpretive study rather than positivist or real studies. Besides, this thesis is a case study analysis of elements influencing the formulation and the implementation of universal service policies in Vietnam in order to interpret and judge these policies, so its ontology complies with a constructivism study (Walliman, 2006).

CHAPTER 5. SUMMARY OF THE PAPERS

This chapter provides a summary of the four papers that are included in the thesis. Each summary presents purposes, essential points and findings as follows.

5.1. SUMMARY OF THE PAPERS

5.1.1. PAPER 1:

Title: Universal service in Vietnam: An institutional approach.

As Williamson (2000) confesses that institutions are very complex, however it remains lack of scientific ambitions studying on these in the neoclassical economics field. In another research, King et al. (1994) state that due to lack of research on the critical institutional factors, or the role of government institutions and institutions in IT innovation, national IT policies are unclear. More importantly, North (1990:35) asserts that in order to understand an institutional makeup, we must explore in depth the characteristics of elements, such as: informal constrains, formal constrains, and enforcement and the way in which they evolve. Apparently, institutional factors play a crucial role in formulating ICT policies. These led the author to recruit the Institutional Theory to investigate the Program 74 (the Program on Provision of Universal Service Until 2010) in Vietnam. By analysing legal documents (like decisions from the CPV, the Prime Minister, MIC, Ministry of Finance, and other documents from the ITU, the World Bank) and incorporated with data from interviews, the Paper has identified that telecommunications development policies in general and universal service policies in particular were significantly affected by the force coming up from the international agreements when Vietnam integrated into the world economy. Moreover, to pave the way for the integration the role of Communist Party of Vietnam was also very critical. The Paper points out that directives of CPV supported for the central government to negotiate with foreign partners to join in the GASS, WTO, and to sign trade agreements. In other words, universal service policies in Vietnam were considerably influenced by the formal institutional factors. These factors shaped a regulatory framework of universal service[13] in Vietnam. This framework determined the scope as well as the administration mechanism to be used to provide universal service. The paper recommends that the central government should deregulate and emphasize the role of provincial governments as well as encourage private sectors/social organizations and rural users to be more involved in

[13] Around 40 different legal documents within 5 years 2006-2010. Available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

the formulation and implementation of universal service policies. Moreover, the government should set up and force the contractual relations between governmental entities and telecom providers, and deploy an auction regime to select the telecom providers with the lowest cost to provide universal service.

5.1.2. PAPER 2:

Title: Universal service in Vietnam: The role of government.

This paper also looks at the Program 74, however from a stakeholder perspective in order to clarify the role of stakeholders as well as initiatives used to implement the Program. To get the objectives, this paper applies a stakeholder framework from Papazafeiropoulou and Pouloudi (2000) to identify which actors implemented the universal service policy and what initiatives used by the central government. Additionally, the paper also employs the qualitative method to clarify the stakeholders' position on performing the universal service policy. The paper finds that the Vietnamese government controlled the universal service policy via an administrative regime that the central government ordered and other stakeholders followed. The universal service policy focused much on delivering universal service and infrastructure, however lack of initiatives rising awareness of rural users about benefit of the internet, or training courses on improving rural users' skills to use the internet. Stakeholders implementing the universal service policy were state entities in which the national government played a central role, no any involvement of private sector and civil society.

5.1.3. PAPER 3:

Title: Examining actors into boosting the provision of universal service in the Vietnamese context.

In Vietnam, besides universal service programs funded by the central government, there was another universal service project tagged 'Improving ability of using computers and public internet access in Vietnam' (the BMGF-VN project) initiated by the Bill and Melinda Gates Foundation (BMGF), a Non-Governmental Organization. The BMGF-VN project was mostly funded by BMGF to the tune of 33.6 million USD. The rest of budget came from MIC, VNPT, Viettel, and provincial governments (16.9 million USD). The main objective was to improve competence and the way of providing information of Public Libraries (PLs) and Cultural Post Offices (CPOs) at 40/63 provinces in order to assist rural users, the poor and vulnerable population to access information. The BMGF-VN project not only focused on providing PLs and CPOs with facilities (e.g. computers, printers, cameras, and software), but also focused on training activities; communicating and advertising the program via public media and events in order to improve the knowledge and skill of

internet users as well as attract rural inhabitants to come to PLs and CPOs. After six years (2011-2017), the BMGF-VN project achieved success. The achievement was illustrated via the amount of time that rural users used computers and connected to the internet; the number of participants accessed to PLs and CPOs; and the desire of staff of PLs and CPOs who still want to run their own activities (by their own budget) to attract more users. The success of the BMGF-VN project led the author to do this paper. The paper looks at the formulation and implementation of the BMGF-VN project to examine which actors participated in the formulation of this project, how their interests were translated into this project, and what lessons may be drawn for the formulation and implementation of universal service policy in Vietnam in general. In order to get the objectives, the paper recruits the Actor Network theory (a framework of actor network analysis from Gao (2005)) and a qualitative analysis. The paper finds that the involvement of non-government actors (like civil society and private sectors), and the focus not only on the supply side but also the demand side is very important in formulating and implementing universal service policies. Deriving inspiration from this project, such a bottom-up approach could be adopted by the Vietnamese government to enable the demand of broadband adoption. This implies that newer actors with newer competence should be encouraged to be partners in the adoption of broadband in Vietnam. In this way, the existing supply initiatives will match up with the demand needed for the broadband infrastructure.

5.1.4. PAPER 4:

Title: Universal service policy in Vietnam: A supply - demand perspective.

After implementing the Program 74, in 2015 the central government issued another program, the Program on Provision of Universal Service Until 2020 (the Program 1168). Although learning lessons from the previous program (the Program 74) in order to include fixed broadband internet connections and mobile telephone services in its scope as well as to target to specific groups[14], the Program 1168 still reveals drawbacks (as analysed in the Paper 4). By applying the framework of King et al. (1994) to analyse the Program 1168, and then make a comparison of policies between Vietnam, and South Korea and Japan, this paper indicates that not only has the Program 1168 provided subsidy for facility-based service providers to build up broadband infrastructure, but also there has been attention to stimulating demand for broadband internet, such as funding schools, hospitals, and commune people's

committee to set up internet connections and use these services with low charges. Nevertheless, the subsidies are not likely to be effective if users are not aware of the

[14] As Jordana et al. (2005) indicate that 'policy initiatives directed at specific groups have more intense impacts on the levels of Internet usage than policy initiatives directed at the general population'.

benefits of ICT, especially dwellers living in unserved and underserved areas lack of knowledge of ICT. The paper recommends that the Vietnamese government should introduce different initiatives to deploy the Program 1168. That means along with support for facility-based service providers, institutes, and users the government also needs to carry out other plans to promote demand, such as plans to improve the knowledge and ICT skills of users or develop applications in education, agriculture, and health information in local languages.

Paper titles	Main findings	Recommendations
Universal service in Vietnam: An institutional approach	- Formal institutional factors (the international agreements and the directives of CPV) remarkably influenced on the formulation and implementation of universal service policy (the Program 74) in Vietnam, in which the international agreements played a leading role and the CPV's directives played a guarantee role. - The interactions between these actors in deploying the Program 74 were transacted via administrative orders, no contractual relations. - The formulation and implementation of the universal service policy were mainly concentrated on action at levels 2 and 3. - The ruling party's directives in an administrative regime seem to be efficient with regard to forcing State-controlled actors to deploy universal service programs and to reach predefined targets, however, inefficient with regard to meeting market needs, and the results may turn out to be unsustainable in the long run.	- The government should deregulate and emphasize the role of provincial governments as well as encourage private sectors/social organizations and rural users to be more involved in the formulation and implementation of universal service policies. - Moreover, the government should set up and force the contractual relations between governmental entities and telecom providers, and deploy an auction regime to select the telecom providers with the lowest cost to provide universal service.
Universal service in Vietnam: The role of government	- The government controlled the universal service policy via a regulatory regime. - The universal service policy focused much on delivering universal service and infrastructure, however lack of initiatives rising awareness of rural users about benefit of the internet, or training	- Encouragement of the participation of private sectors and civil society as well as adopting an approach based on deregulation and market principles. As such, a sustainable universal service coverage is to be achieved.

Paper titles	Main findings	Recommendations
	courses on improving rural users' skills to use the internet. - Stakeholders implementing the universal service policy were state entities in which the national government played a central role, no any involvement of private sectors and civil society.	
Examining actors into boosting the provision of universal service in the Vietnamese context	- The alignment of interests of different actors and the involvement of non-government actors (like civil society and private sectors). - The focus not only on the supply side but also demand side were very important in formulating and implementing universal service policies.	Deriving inspiration from this project, such a bottom-up approach could be adopted by the Vietnamese government to enable the demand of broadband adoption. This implies that newer actors with newer competence should be encouraged to be partners in the adoption of broadband in Vietnam. In this way, the existing supply initiatives will match up with the demand needed for the broadband infrastructure.
Universal service policy in Vietnam: A supply - demand perspective	The Program 1168 is somewhat simple, the Vietnamese government only carries out subsidization measures both for telecom providers and users. They do not pay attention to increasing the knowledge and ICT skills of users (knowledge deployment and mobilization strategies) or funding research institutes, enterprises to research developing the content (knowledge building strategy).	The government should introduce a wide range of initiatives to deploy the Program 1168. That means along with support for facility-based service providers, institutes, and users the government also needs to carry out other plans to promote demand, such as plans to improve the knowledge and ICT skills of users or develop applications in education, agriculture, and health information in local languages.

Table 3: Summary of the findings and recommendations from the four papers

5.2. LIMITATIONS

Although all the four appended papers apply various theories to analyse universal service in Vietnam and show the findings by providing the government with policies suggestions, they still have limitations. Overall, all the four papers analyse policies from the government point of view, not from the users' point of view or the demand side. Thus, all these papers apply qualitative approaches, not quantitative methods.

Specifically, Paper 1 and Paper 2 are the case studies that look at Vietnam. The two papers lack comparisons with other nations that have similar conditions to Vietnam. Making comparisons could make some generalizations for the development of universal service policies. Paper 3 looks at a non-government project to make some policy lessons for the central government. However, it is necessary to analyse other projects, it could build up more concrete lessons. Paper 4 was analysed just three months after the Program 1168 was issued, thus it needs a period to observe this Program deploying in order to get more data for an overall analysis.

CHAPER 6. DISCUSSION AND CONCLUSIONS

This chapter analyses the findings of each paper summarised in Section 5.1 and discusses how these findings contribute to the main thesis. Based on these, policy recommendations are drawn. Lastly, conclusions of the thesis are also provided.

6.1. DISCUSSION

Based on the findings and recommendations from the four papers provided in Section 5.1, this Section discusses deeply the approaches that the Vietnamese government could pursue to enhance universal service. In other words, this Section answers to the main research question of the thesis '*What are the appropriate universal service policies for Vietnam to enhance universal service?*' as the followings:

1. Limitation of the intervention into the administrative/regulatory regime. Set up contractual relations and base on a market regime to promote both competition and universal service (Paper 1 and Paper 2).

> *'Free markets do not in themselves mean efficient markets. Efficient markets imply a well-specified legal system, a well-specified and impartial third party of government to enforce them, and a set of attitudes toward contracting and trading that encourage people to engage in them at low cost' (North, 1986).*

As the findings of Paper 1 show that Vietnam has applied a top-down approach to deploy their universal service polices. However, this approach just bases on an administrative regime that the central government orders/regulates and other actors follow, it is not based on a market-oriented regime. That means that the provision of universal service in Vietnam involves substantial regulatory or administrative efforts in terms of steps to deliver universal service. These efforts include: building up plans (both MIC, VTF, and telecom providers), approval of these plans (MIC), collection and distribution of funding (VTF and telecom providers), supervising (DICs and VTF), and administration fees (the interactions among these actors are described in Paper 2). In other words, this regime increases costs and influences the efficiency in the implementation of universal service policies. Moreover, due to the lack of the 'check and balances' mechanism in Vietnam (the separations of powers among the Congress, the Government, and the Supreme Courts; and the independence of press media), the policymakers and regulators (MIC) who formulate universal service policies are easier to be captured by telecom providers or interest groups (Laffont, 2005:3). They could design universal service policies favouring their interests or some

specific incumbent providers and impeding other actors (e.g. DICs, or other telecom providers).

Hence, to make universal service policies efficient, the costs of the transactions need to be reduced or the government should deregulate the provision of universal service. That means the government should:

- Limit intervention in the administrative/regulatory regime.

- Set up contractual relations that force parties to obey contracts or agreements. In other words, the contractual regime strengthens the rules of law by forcing actors follow the rules that is the weakness in developing nations (Laffont, 2005)

- Base on a market regime to promote both competition and universal service by carrying out the bidding and auctions to provide universal service[15].

The case of South Korea could be a good lesson for Vietnam where the Korean government also played a critical role and intervened directly into the market. However, here the top-down approach has been supplemented with the use of market-oriented mechanisms. The central government introduced various initiatives to promote a competitive market (Lee et al., 2003) such as: implementing the hands-off policy to deregulate the registration procedure and encourage the participation of private sector into this field; promoting the broadband access platform in apartments and new buildings (Choudrie & Lee, 2004; H. Lee et al., 2003). In addition to the direct intervention, other remedies promoting demand such as: funding research institutes and universities; and paying much attention to users (Choudrie & Lee, 2004; Lee et al., 2003) have made a big contribution to the success of South Korea.

2. Encouraging the participation of civil society and private sectors as well as aligning the interests of different actors in providing universal service (Paper 2 and Paper 3).

> *'We must not leave out any group or individual who can affect or is affected by organizational purpose, because that group may prevent our accomplishments'. 'If business organizations are to be successful in the current and future environment then executives must take multiple stakeholder groups into account' (Freeman, 2010).*

The findings of Paper 2 indicate that actors who participated into the provision of universal service in Vietnam were the state entities, like MIC, DICs, VTF, and telecom providers (VNPT, Viettel, and Vishipel) in which MIC played a central role. However, there was no any involvement of other actors, like civil society and private sectors

[15] Seeing Nett (1998) and Weller (1999) for more detail about auctions.

delivering and supervising the provision of universal service. As a result, it caused an overlap in the provision of universal service (one household could receive funds from two or more telecom providers for using one telephony service/internet service). Universal services delivered was not reflecting rural users' need[16].

The role of private sectors and civil society as well as the alignment of interests of different actors in the formulation and implementation of national policies have been shown by many researchers. According to Walsham (1997) 'successful networks of aligned interests are created through the enrolment of a sufficient body of allies, and the translation of their interests so that they are willing to participate in particular ways of thinking and acting which maintain the network'. Many other studies also indicate that to increase the rate of success in implementation of information system or to formulate an efficient national strategy, the government should study attitudes and interests of multiple stakeholders as well as the involvement of the widest players (Gao, 2005; Papazafeiropoulou & Pouloudi, 2000; M. Scott et al., 2004). On the other hand, Shleifer (1998) asserts that private sectors play a vital role much more than those of a public sector. He indicates that due to a fraction of the return, government employees have relative weak incentives to invest to reduce costs and improve quality or innovate. In contrast, private sectors have much stronger incentives because they get more of the returns on the investment.

More importantly, the findings of Paper 3 point out that the alignment of the interests of different actors and the encouragement of the participation of civil society and private sectors in delivering universal service were critical in implementing universal service policies. Hence, the government should encourage the participation of civil society and private sectors as well as align the interests of different actors in providing universal service in Vietnam.

3. Promote both supply and demand side (Paper 2, Paper 3 and Paper 4)

The findings of Paper 2 and Paper 4 show that Vietnam has focused much on the supply side, like subsidizing operators for infrastructure roll-out and maintaining the existence of public tele/internet centers; subsidizing rural users to use universal service. There has been little focus on the demand side, like rising awareness of rural users about the benefits of the internet and provision of training courses improving their skills to use the internet. Focusing much on the supply side (neglect on the demand side) might increase the development of universal service in short time, however it will not be sustainable. In the case of Vietnam, many users gave up their

[16] In the Program 1168, the government provided poor people with subsidy to use mobile telephone service. However, they only subsidized for post-paid subscription, not funding for pre-paid subscription, and this subsidy was just used to listen to the incoming calls. If the user makes a call, they have to pay for this call. Consequently, few poor households registered to get subsidy.

subscription, when the government stopped subsidy. A number of rural users used universal services just because it was free of charge[17]. Both Program 74 and Program 1168 have promoted the demand side (by providing rural users/public institutions subsidy to adopt universal service), however it has been relatively simple and seems insufficient to be an effective policy. Many studies have shown the importance of providing users with ICT-related skills and training courses on the benefit of the ICT (Choudrie, Jyoti Papazafeiropoulou & Lee, 2003; Jan Damsgaard & Lyytinen, 2001; Falch, 2007; Youtie et al., 2007), or the importance of demand side policies over supply side policies in some stages of development of broadband (Belloc, Nicita, & Alessandra Rossi, 2012).

To support demand side policies, case studies in South Korea and Japan in Paper 4 indicate that along with support for facility-based service providers, institutes, and users the government also needs to carry out other plans promoting demand, such as plans to improve the knowledge and ICT skills of users or develop applications in education, agriculture, and health information in local languages.

Practically, via analysing the BMGF-VN project in Vietnam the findings of Paper 3 show that besides providing public libraries and cultural post offices with facilities (like computers, printers, cameras, and software), the BMGF-VN project also focused much on stimulating demand side. In other words, they applied different initiatives to promote demand side, such as: organizing training courses on ICT skills for staff working in cultural post offices and librarians; deploying marketing activities on public media as well as holding events/games to bring ICT awareness and knowledge to users; usually carrying out evaluation of the influence of the training and marketing activities, and rural users' ICT needs in order to update and adjust the contents to fit their needs. Especially, the BMGF-VN project mobilized the participation of various non-government actors (Learning Promotion Association or Youth/Women Associations) in deploying the project. These associations, in this project, acted like a marketing channel to encourage and persuade rural users to participate in these events and the training courses. Their success will be a very good lesson for the government on applying both supply and demand side to enhance universal service.

The government can pursue separately or all three approaches recommended. These approaches are not mutually exclusive.

[17] Report on the implementation of the Program 74 (MIC, Pg:27). The other reasons for the drop off in usage of universal service were due to the low quality of the service as well as the competition between telecom providers in attracting users (https://www.baomoi.com/dan-tu-roi-mang-o-vung-vien-thong-cong-ich/c/4963325.epi)

6.2. CONCLUSIONS AND FUTURE RESEARCH

6.2.1. CONCLUSIONS

The thesis has so far analysed the universal service policies in Vietnam as well as looked at universal service/broadband development policies from other nations in order to explore approaches to reinforce universal service in Vietnam. The thesis based on four papers combined in this thesis to analyse the status quo and point out issues on universal service in Vietnam. By applying different theoretical perspectives that support to explain the Vietnamese circumstance under both social and market perspectives, and additionally a qualitative content analysis, the thesis provides the government with appropriate approaches.

On the social or institutional perspective, the government should limit intervention into the administrative/regulatory regime and set up contractual relations based on a market regime to provide universal service. Introducing many regulations or intervening much into the administrative regime to deliver universal service means that the government uses much of public resources (like budget and human resource) leading to increasing transaction cost and influencing the efficiency of universal service policies. Establishment of contractual relations will enable the implementation of the contracts between actors as well as increase the enforcement in providing universal service.

On the market perspective, the government should firstly encourage the participation of civil society and the private sectors as well as aligning the interests of different actors in providing universal service. Secondly, the government should promote both supply and demand side to enhance universal service. Both supply and demand side initiatives will complement each other to deliver universal service. Even though, in some later stages of the penetration of broadband or universal service, demand side initiatives appear to have a positive and statistically significant effect on the rate of broadband adoption higher than that exerted in the previous stages (Belloc et al., 2012).

Moreover, the thesis has also contributed to the practical and theoretical literature. The thesis has provided an empirical study on the universal service filed. Although universal service is not a new topic, there has been little research on universal service relating to Vietnam. The case of Vietnam provides a unique example and contributes to an overall picture of universal service in the world. On the literature side, there is a great emphasis on a market-based approach. The market-based approach provides frameworks where the market will facilitate demand and supply on telecommunication and IT infrastructure. The argument was that the administrative approach was not efficient towards achieving universal service. But the Vietnamese approach provides an insight to the fact that politic in an administrative approach can

enable the delivery of telecommunication and IT infrastructure and obtain predefined targets, however it is unsustainable. On the theoretical side, the Actor Network Theory, Stakeholder Theory, Supply-Demand side, and Institutional Theory have been proven to be efficient descriptive theories. Moreover, a theory triangulation that uses different theoretical perspectives to look at the same data has been recruited to explore deeper the universal service policies in Vietnam. The challenge lies in their high level of subjectivity and lack of universal frameworks. However, in this research, some challenges in the utilization of the theory points to the need for universal frameworks for these theories.

On the methodological side, the thesis has indicated that the interpretive philosophy is an appropriate means to do research in the social field. It directed the research methods adopted in the thesis. More specifically, to get deep insights into the provision of universal service in Vietnam it is critical to understand the universal service policies implemented; which regulations had an impact on the implementation of the universal service; and who and what influenced the regulations. The interpretive philosophy was employed to investigate and explain these issues from the researcher's perspective. The deductive approach and qualitative content analysis were applied to analyse the data gathered from the multiple sources.

6.2.2. FUTURE RESEARCH

The main goal of this thesis is to identify issues on providing universal service in Vietnam, based on that approaches to enhance universal service will be recommended. However, the thesis bases much on the government point of view (a top-down approach or a supply perspective) to do research, lacks analysis from users' point of view (a bottom-up approach or a demand perspective). Future research should also pay attention to users' point of view in order to realize their real needs. Based on that policy recommendations for adopting universal service will be better.

On the other side, the thesis looks at universal service under social and market perspectives. However, many approaches have not been explored yet or need to delve deeper, such as: applying the Transaction Cost Economics - The New Institutional Economics (O. E. Williamson, Douglass C. North, J. J. Laffont) to analyse the whole telecom market in Vietnam; designing a Public Private Initiative model for providing universal service/municipal initiatives; promoting competition (Cable technology) and service based competition. These approaches may be critical to support the government to enhance universal service in particular, the telecommunications market in general.

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APPENDIX 1: LIST OF THE INTERVIEWEES

In 2015

Interviewees	Organizations
An official	MIC's Department of Finance and Planning
A vice director	DIC in Thanhhoa province
A chief of the Trading Division	VNPT's branch in Thanhhoa province
A chief of Telecommunications Division	DIC in Haiduong province
A chief of Technological Division	FPT's branch in Haiduong province (One of major internet service providers in Vietnam)
A former Director	VTF (just discussion)
A former Chief of the Planning and Funding Division	VTF
A vice chief of the Project Appraisal Division	VTF

In 2016-2017

Interviewees	Organizations
The director	The BMGF-VN Project
Two vice directors	DICs in Laocai and Soctrang province
A vice director	VNPT's branch in Laocai province
A director	The Soctrang provincial Library
Two Liberians	The Kesach Library in the Soctrang province
Two staff	The Cultural Post Offices at Anmy Commune (Soctrang province) and Taphin Commune (Laocai province)
A former Chief of Planning and Funding Division	VTF
A vice chief of the Service Division	The Management Unit of the Provision of Universal Service

APPENDIX 2: LIST OF THE APPENDED PAPERS

Paper 1: Thai, D. M. & Falch, M. (2017). Universal service in Vietnam: An institutional approach. *Telecommunications Policy (2017)*, https://doi.org/10.1016/j.telpol.2017.10.003

Paper 2: Thai, D. M., Falch, M., & Williams, I. Universal service in Vietnam: The role of government. *Digital Policy, Regulation and Governance (Forthcoming).*

(The first version of the paper was presented at the 26th ITS Conference in Madrid, Spain in 2015)

Paper 3: Thai, D. M. & Williams, I (2017). Examining actors into boosting the provision of universal service in the Vietnamese context. *Proceedings of the 14th ITS Asia - Pacific Conference, Kyoto, Japan, 2017.*

Paper 4: Thai, D. M., Falch, M., & Salakpi, S. von Y. (2016). Universal service policy in Vietnam: A supply - demand perspective. *Nordic and Baltic Journal of Information and Communications Technologies*, *2016*(1), 123–140.

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Universal service in Vietnam: An institutional approach

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ABSTRACT

Applying institutional theory to look at the Program 74 (a universal service policy) in Vietnam, this paper concludes that the Vietnamese universal service policy was strongly affected by formal institutional factors (the international agreements and the directives of the Communist Party of Vietnam - CPV), in which the international agreements played a leading role and the CPV's directives played a guarantee role. The formulation and implementation of the universal service policy in Vietnam were mainly concentrated on action at levels 2 and 3 (formal and informal institutional arrangement, and formal institutional environment). The paper recommends that nations favouring a top-down approach not based on a market-oriented regime should deregulate and emphasize the role of provincial governments as well as encourage private sectors/social organizations and rural users to be more involved in the formulation and implementation of universal service policies. Moreover, the government should set up and force the contractual relations between governmental entities and telecom providers.

1. Introduction

Universal coverage of Internet services is a policy aim in almost any country. However, the strategies applied to achieve this goal differ from country to country especially with regard to prioritization of various policy tools. Some countries focus mainly on coverage of fiber networks, while other countries put more emphasis on demand stimulation. Also, the level and kinds of public sector involvement varies. These national differences are rooted in differences in history, markets and institutional structures (Lemstra & Melody, 2014). Vietnam provides a unique example of this. Vietnam follows the international trend of liberalization of telecom markets, but the Communist Party of Vietnam still exercises a strong influence on the telecom agenda, and the strategy applied for meeting universal service objectives. This paper applies the four-layer model of Koppenjan and Groenewegen (2005) to examine how institutional factors have shaped universal service policy in Vietnam.

The concept of universal service was initially used by Theodore Vail of the Bell System in a campaign prohibiting competition and establishing a regulated monopoly in the United States (Mueller, 1993). At that time, universal service meant the interconnection of all telephone users into a single system, not by providing basic telephone service to all users (Mueller, 1993). However, nowadays, this concept has been considerably changed and constantly expanded (Alleman, Rappoport, & Banerjee, 2010; Milne, 1998; Msimang, 2012). Universal service has been not only regarded as the provision of basic voice telephone (Garnham, 2001; Levin, 2010) at an affordable price, it is also being extended to include dial-up and broadband internet in its scope (Levin, 2010; Msimang, 2012). Furthermore, in some parts of the world broadband connection nowadays covers 100% of households (in Europe in 2013) and their next target has fastened the speed of broadband up to 30 Mbps or more for all by 2020 (European Commission, 2013).

The scope of universal service is evolving in some countries. Policies play a critical role in stimulating the development of ICTs in

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general and telecoms services in particular (Falch, 2007). The universal service policy is also a useful instrument to close the digital divide between users (low and high-income users) and areas (low and high-cost areas) in a nation (Blackman & Srivastava, 2011). According to the ITU, universal service has three fundamental characteristics: availability, accessibility, and affordability. The main target of universal service is to ensure individual accessibility to basic telecommunications services regardless of geography, gender, ethnicity, disabilities or other factors. Similarly, Laffont and Tirole (2000) posit that the objectives of universal service are redistribution towards low-income residents and provision of more potential benefits to rural areas (regional planning). They point out that universal service 'ensures the quality of telecommunication services at affordable rates to consumers, including low-income consumers, in all regions of the nation, including rural, insular, and high-cost areas'.

To close the gap, there are various factors essential to explore. In other words, there are a wide range of ways that governments are able to pursue, such as market liberalization, promotion of competition, raising awareness of ICT benefits, improving the skill of ICT usage, and making it affordable and more attractive to users (Kelly & Rossotto, 2012). A number of authors have studied the role of the government (Falch, 2007; Gillett, Lehr, & Osorio, 2004; Lee & Chan-Olmsted, 2004; Picot & Wernick, 2007; Thai, Falch, & Williams, 2015), some have presented new models (Falch & Anyimadu, 2003; Falch & Henten, 2010; Peha, 1999), and others have identified factors influencing the adoption of internet/broadband (Chaudhuri, Flamm, & Horrigan, 2005; Choudrie & Dwivedi, 2006; Flamm & Chaudhuri, 2007; LaRose, Gregg, Strover, Straubhaar, & Carpenter, 2007; Thai, Falch, Salakpi & Von 2016). These studies implicitly or explicitly point out the way bringing more advance of ICTs for citizens.

Vietnam is an emerging economy with a unique political system. Vietnam has since 2005 emphasized on the provision of universal service. In 2006, Vietnam launched the "Program on the provision of public telecommunications services till 2010" (hereinafter called the Program 74). The Program 74 was implemented from 2005 to 2010, with the total budget of approximately 210 million euros. The Program achieved remarkably success, however it also revealed many unsettled issues. This paper analyses the Program 74 (it is also considered as a universal service policy in Vietnam) from an institutional perspective, with the empirical case from Vietnam. The paper is guided by the following research questions:

Which and how institutional factors influenced the Program 74?

What policy lessons may be drawn for nations favouring a top-down approach similar to the one applied in Vietnam?

The paper applies the Koppenjan and Groenewegen (2005)'s four-layer model 'levels of institutional analysis' to look at the universal service policy in Vietnam. This model was designed by analysing the role of institutions in the context of complex technological systems. Moreover, this model is used to evaluate secondary documents gathered from Ministry of Information and Communications of Vietnam (MIC), Vietnam Public Utility Telecommunication Service Fund (VTF), and some data from ITU and the World Bank. The authors also conducted some interviews with officials working in MIC, VTF and DICs (Departments of Information and Communications) in July 2015.

The paper is structured as follows: Section 2 presents the theoretical framework and research method, Section 3 analyses institutional layers in Vietnam, Section 4 is discussion, and eventually Section 5 provides conclusions.

2. Theoretical framework and research method

2.1. Theoretical framework

The concept of institutions is very diverse and depends on the way it is approached (King, Gurbaxani, Kraemer, Mcfarlan, & Yap, 1994; Scott, 1987). According to Scott (2005), institutional theory looks at the processes and mechanisms that form structures, rules, and routines in order to explain social behaviour. He indicates that contemporary institutional theory consists of three main approaches: Rational-choice, Normative, and Cultural-cognitive approaches. Rational-choice approach views regulatory aspects or rule systems of institutions that are created by individuals to promote or protect their own interests. The most popular form of this approach is 'transaction cost economics' devised by Ronald Coase and developed by Oliver E. Williamson (Scott, 2005). Normative approach refers to shared norms and values that introduce a prescriptive, evaluative, and obligatory dimension into social life. And cultural-cognitive approach emphasizes the importance of widely shared assumptions and beliefs and the construction of social identities as the underpinnings of social order (Scott, 2005).

From an economic approach, North (1990:3) defines institutions as 'the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction'. Institutions are formed to guide human beings into interaction and to reduce uncertainty in their daily life (North, 1990, p. 6). North (1990:35) also asserts that a model of institutions has three characteristics: informal constrains, formal constrains, and enforcement. Informal constraints are codes of conducts, norms of behaviour, and conventions and are a part of culture. Formal constraints are formal rules, from constitutions, to statute and laws, to bylaws, and to individual contracts. Formal rules are created and evolved along with increasingly complex societies, and can complement and increase the effectiveness of informal constrains (North, 1990). Enforcement deals with how effectively parties are enforced to obey contracts or agreements. More importantly, North (1990:53) concludes that in order to develop an institution, we should put them together to look at. A mixture of these three factors will define the choice set and result in outcomes.

Also, looking at institutions/organizations from an economic perspective, Oliver E. Williamson emphasizes transaction cost economics - exchanges of values among individuals, and economics of property rights in the New Institutional Economics. In his research (Williamson, 1998, 2000), he illustrates the establishment of the New Institutional Economics via four layers: Level 1 - Embeddedness: Informal institutions, like: customs, traditions, norms, religion; Level 2 - Institutional environment: Formal rules of the game, like: property (polity, judiciary, bureaucracy); Level 3 - Governance: Play of the game, like: contract (aligning governance structure with transactions); Level 4 - Resource allocation and employment (prices and quantities, incentive alignment). In this model, the higher level

imposes constrains on the immediate lower, and the lower level gives feedback to higher levels. Basically, in this model he explains economic relations/transactions among actors implemented via contracts that are devised to govern the transactions (level 3). As the transactions become more complex, the cost of negotiating and policing contracts increases. It is necessary to construct contract laws and mechanisms, such as property rights, organizational hierarchies, political regimes (level 2) - in order to manage and enforce the transactions. However, the construction of rules of the game is affected by customs, traditions, norms, and religion (level 1). The task of the institutional scholar is to determine what types of governance structures are best equipped to address what types of transaction costs (Scott, 2005). He also calls more study on technological and organizational innovation in a combined manner (Williamson, 2000).

Based on the Williamson's four-layer model, Koppenjan and Groenewegen (2005) also introduce a four-layer model that is considered in processes of institutional design. In their research, they define institutions as 'a set of rules that regulates the interaction between parties involved in the functioning of a (technological) system'. They argue that in the design/redesign of complex technological systems, it is necessary to look not only on technological challenges involved, but also to analyse the institutional structure that coordinates the positions, relations, and behaviour of the parties in the system. This will make these systems more stable and reduce the transaction costs between parties.

In the Koppenjan & Groenewegen's four-layer model, the first layer is the level of individual actors (like firms and households) and their interactions in the context of a complex technological system in order to create and influence provisions, services, and outcomes. The second layer includes formal and informal institutional arrangements of socio-technological systems. At this level, agents in networks create regimes or mechanisms to coordinate the transactions relating to labour, capital, intermediate goods, information, and so on. Formal arrangements are contracts, joint ventures, strategic alliances, etc. Informal arrangements are codes of conduct, norms, and relations. The third layer of the model is legal rules that are the formal rules of the game. This layer determines the legal positions of the players of the game and the mechanism available to coordinate transactions. The last layer includes elements such as culture, values, norms, and attitudes. They constitute the informal institutional environment and they influence significantly the mind-set of actors in networks in layer 1. This layer determines the kinds of incentive structures which are acceptable and effective.

In this model, these layers interact and influence each other. The higher layers constrain and shape the lower ones and the lower layers influence the development of the higher ones (Fig. 1). This model differs from the Williamson's four-layer model in two points: Firstly, all layers are connected to each other, and secondly the layer of actors and their strategies is added to transaction cost approach (Koppenjan & Groenewegen, 2005).

This framework has been developed as a conceptual framework for analysing the institutional design in the field of privatization of

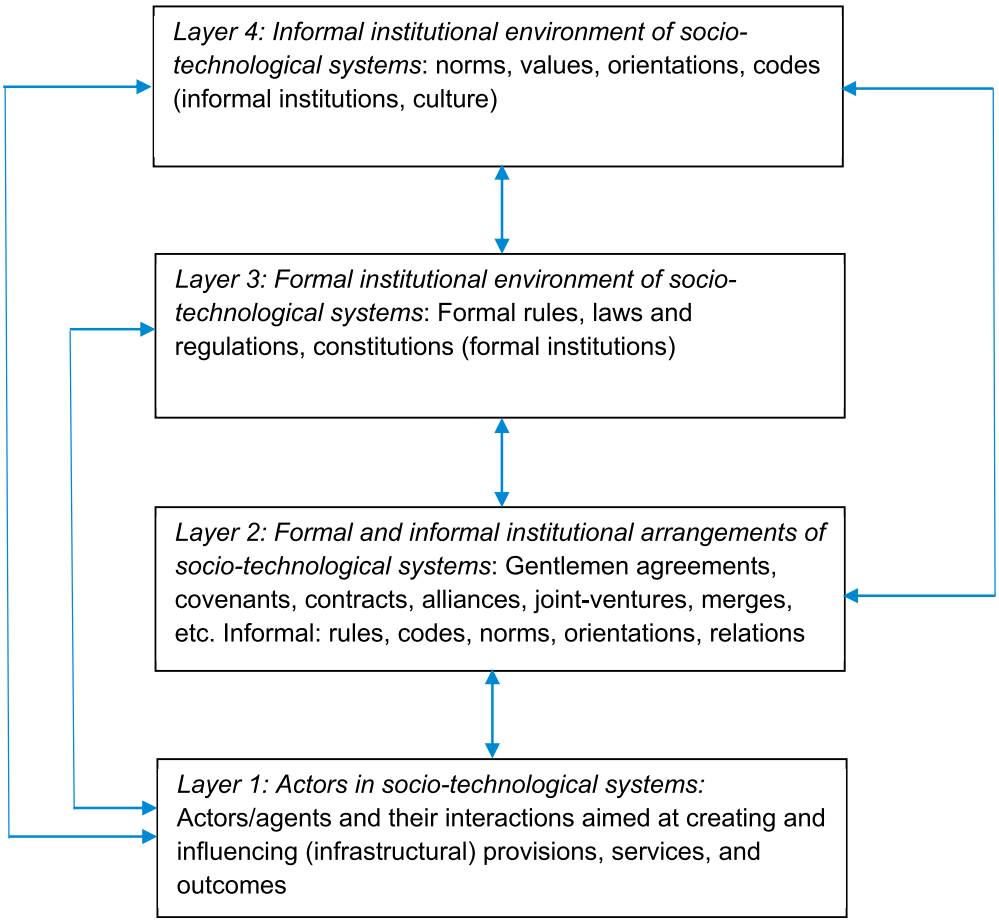

Fig. 1. The four-layer model (Koppenjan & Groenewegen, 2005).

Table 1
List of interviewees conducted.

Interviewees	Organizations
An official	MIC's Department of Finance and Planning
A vice director	DIC in Thanhhoa province
A chief of Trading Division	VNPT's branch in Thanhhoa province
A chief of Telecommunication Division	DIC in Haiduong province
A chief of Technological Division	FPT's branch in Haiduong province (One of major internet service providers in Vietnam)
A former Director	VTF (just discussion)
A former Chief of Planning and Funding Division	VTF
A vice chief of Project Appraisal Division	VTF

public infrastructures, such as telecommunications, and is widely used in analyses of telecom and broadband policy (Howell & Sangekar, 2009; Lemstra & Melody, 2014). Howell and Sangekar (2009) apply this framework to analyse the participants' actions in telecommunications markets in New Zealand and Finland to identify the factors explaining the big differences in the development of telecommunications markets in these two countries. In the book titled 'The dynamics of broadband markets in Europe' Lemstra and Melody (2014) apply the four-layer model to identify factors regarding history, markets and institutional structures influencing broadband policies and their outcome in Europe.

2.2. Research method

This paper applies the four-layer model of Koppenjan and Groenewegen (2005) to identify which institutional factors influenced the formulation and deployment of the Program 74 in Vietnam from 2000-2010.[1]

The Program 74 defines the term 'universal service' as standard telephone service (PSTN telephony service), standard Internet access service (dial-up/broadband internet access service), and mandatory services such as emergency calls. This concept of 'public telecommunications service' is used in the definition of universal service in this paper. The rural or under/unserved areas provided demanding universal services are areas with a tele-density below 2.5 percent.

The paper recruits the qualitative method to analyse secondary documents such as documents of the Vietnamese governments (the data was mainly collected from Vietnamese Ministry of Information and Communication and the Vietnam Public Utility Telecommunication Service Fund), and some data from ITU and the World Bank. The documentary analysis is appropriate to examine public and private documents, and 'enables a researcher to obtain the language and words of participants at a convenient time' (Creswell, 2009). Moreover, to complement the documentary analysis, the authors also conducted interviews with officials working in MIC, DICs, and VTF in July 2015. The list of interviewees is described in Table 1 below:

3. Analysis of institutional layers in Vietnam

3.1. Overview of the program 74

Before 2005 Vietnam delivered universal service under the cross-subsidy regime that was mandated to VNPT, the incumbent operator. In compliance with the Bilateral Trade Agreement signed with the United States, and international commitments on competition from the World Trade Organization (WTO) and General Agreement on Trade in Services (GATS) on basic telecommunications (Ha, Thanh, & Gullish, 2005), in 2005 the government had to give up the price support regime and look for other tools to deliver universal service.

In 2006, Vietnam launched the 'Program on the provision of public telecommunications service till 2010' (the Program 74). The Program 74 was implemented from 2005 to 2010. The total budget of Program 74 was approximately 210 million euros mainly collected from telecom providers (part of them, 4 million euros, came from the budget of ministries and provinces).[2] The main targets of the Program 74 were[3]:

- a tele-density of 5 lines per 100 inhabitants;
- at least 1 tele-centre in all communes;
- at least a public internet access centre in 70% of the communes;
- access to the emergency telephone services for all citizens.

[1] In this research, the Program 74 (the universal service policy) is considered as a complex technological system. The policy has also four characteristics as a complex technological system does, such as: a technological component is important, but does not determine the functioning of the system; multiple parties involved; both public and private parties involved; and complex technological systems can be influenced by both market forces and government regulation (Koppenjan & Groenewegen, 2005).

[2] Telecom providers had to pay 5% of the mobile services revenue, 4% of the revenue of international telephone services and international leased - line service, and 3% of the revenue of domestic long distance telephone services and domestic leased - line service (since 2008 these rates were reduced to 3%, 2% and 1% respectively - Decision 186/2007/QD-TTg). The financial contribution would be collected by VTF every quarter. Decision 186/2007/QD-TTg, available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

[3] Decision 74/2006/QD-TTg, available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

Table 2
Institutional factors affecting the Program 74.

Layer	Description
Layer 1: Actors and games	MIC, VTF, DICs, telecom providers (VNPT, Viettel, ETC, and Vishipel), and rural users (inhabitants or households) in implementing the provision of universal service
Layer 2: Formal and informal institutional arrangements	The administrative mechanism (regulated at the Circular 05/2006/TT-BBCVT)
Layer 3: Formal institutional environment	The Directive 58; the Bilateral Trade Agreement between Vietnam and the US; requirements from WTO; the Ordinance on Post and Telecommunications; the Decision 191 and the Decision 74.
Layer 4: Informal institutional environment	The Western notions.

To reach these targets, the Program 74 provided subsidies to develop infrastructure; to establish and operate public telephone and internet access service centres; and to offer fixed telephone and/or internet access services to rural users. These initiatives focused on all inhabitants and households living in areas having the tele-density below 2.5 sets per 100 inhabitants.

The form of provision of universal service was solely implemented by 'order place' or 'plan assignment'[4] imposed on incumbent operators, no bidding to select the carriers demanding the lowest subsidies was made. This implies that MIC had to rely on its budget and price/cost of provision of universal services and/or telecom providers' capability to order or assign provision of universal service to them. Based on the amount of universal service delivered, VTF would transfer the telecom providers funding.

After five years (2005–2010), the Program 74 achieved remarkably successes: the number of fixed telephone subsidized was 2.648.492 subscribers made the tele-density reached 16 lines per 100 inhabitants (increased threefold from the initial objective); the number of internet subscribers subsidized was 113.025 subscribers made the penetration of the internet reached 0.32% in 2009 (increased almost twofold compared to that in 2004); the number of public telephone and internet access centres financed to maintain their activities was 3211 attributed to 97% of communes across the country having at least a public telephone centre, and 55% of communes having a public internet access centre.[5]

3.2. Analysis of universal service in Vietnam

Applying the four-layer model of Koppenjan and Groenewegen (2005) institutional factors affecting the Program 74 have been identified.

3.2.1. Layer 1

The actors in this layer range from the national level to local level (Thai et al., 2015), these include MIC, VTF, DICs, telecom providers (VNPT, Viettel, ETC, and Vishipel), and rural users (inhabitants or households). MIC is in charge of both regulatory and policy making in terms of telecom, post, frequency radio, spectrum license, and the press. DICs are the provincial government entities in charge of the same field as MIC. VTF is a body belonging to MIC and was responsible for collecting financial contributions from telecom providers as well as providing them with subsidies in compliance with MIC's plans. Telecom providers delivering universal service were state-owned companies providing both telecommunications services and networks.

The interactions among these actors enhanced the provision of universal service in under or unserved areas. In their study, Thai et al. (2015) argue that all of these actors played a role in implementing the Program 74. Especially MIC had a central role as they created the rules of the game. MIC designed the Program 74 and submitted it to the Prime Minister for approval. After being approved, MIC clarified the Program 74 by issuing a series of decisions or legal documents to instruct and guide other actors to implement the program. In an interview, an official of MIC who participated in managing and supervising the Program 74 said that 'Apparently, MIC played an important role in building up and instructing other actors to implement the Program. Besides, the role of telecom providers was also critical'.

According to him, DICs as a provincial body at provinces governing ICT activities could have played an important role in deploying the Program 74. Due to DICs' jurisdiction, they could have designed provincial initiatives of providing universal service that would been appropriate with their own conditions and guided local operators to implement them. However, in the first stage of the Program 74, their role was ignored and not embraced. Local telecom providers relied on their own business strategies as well as the instructions from MIC and their mother company to implement the Program 74.

3.2.2. Layer 2

According to Koppenjan and Groenewegen (2005), actors at this level make institutional arrangements or mechanisms to coordinate transactions. In this case, the mechanisms were administrative orders issued by MIC to direct VTF, DICs, and telecom providers to operate. No auctions or any market based regimes were applied. In this regard, the key legal document issued by MIC was the Circular 05/2006/TT-BBCVT (the Circular 05).

[4] 'Order place' meant that authorized-state-entities based on their budget and price of provision of universal service to address subsidy and sign contracts with enterprises to deliver the service. 'Plan assignment' meant that authorized-state-entities based on their budget and state-owned-enterprises' capability and business plans to assign these enterprises to deliver universal service (Decision 256/2006/QD-TTg).

[5] Report on the results of the Program 74:pg 15, MIC-2012.

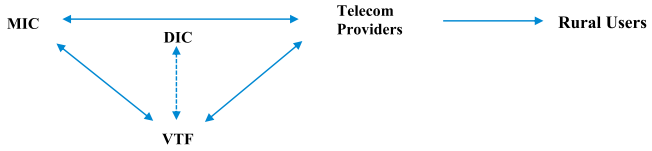

Fig. 2. The interactions among actors (Circular 05/2006/TT-BBCVT).[91]

According to the Circular 05 (as demonstrated in Fig. 2), MIC requested telecom providers who were keen on providing universal service to prepare their plans and submit them to MIC for approval. Telecom providers' plans should document their capabilities and budget needed to deliver universal service. These plans also included estimated numbers of fixed lines, of internet connections, and of public internet access centres that would be developed.

On the other side, VTF was requested to submit to MIC for approval with information on how much of the subsidy to be allocated to telecom providers and how much of incumbent providers' annual revenue to be collected.[6] Based on the approved plan, VTF provided funding to the telecom providers. The interactions between VTF and telecom providers were partly established through credit contracts that were signed to provide these operators with low-interest loans within a certain period for developing infrastructure.

Another actor participating in making the institutional interaction was DICs. DICs were involved in the Program 74 by supervising telecom providers' provision of universal service within their respective provinces.[7] DICs were mandated by MIC to verify telecom providers' plans to ensure they were consistent with other ICT plans within the local area.[8]The role of DICs was relatively modest. They acted as an observer of the implementation of the Program 74 rather than as a rule-maker, a financier or an infrastructure developer (Gillett et al., 2004). They could not supervise telecom providers to execute the provision of universal service or to adjust the Program 74, if the Program did not fit with rural inhabitants' demand in their province. As an official of MIC said: 'the participation of DICs in verifying the kind of universal service to be delivered by telecom providers was late (due to lack of detailed instructions from MIC). Hence, this impacted on supervising and delivering subsidies to telecom providers'. Additionally, a vice director of a DIC in an interview in July 2015 said 'Many of our ideas or opinions in terms of improving the provision of universal service were not considered by MIC. Consequently, a part of the universal service provided was not in line with the needs of the rural users'.

Fig. 2 illustrates that there was no direct interaction between MIC, or VTF, or DICs and the rural users, and only one-way communication between telecom providers and rural users. Rural users were the main objects and beneficiaries targeted by the Program 74[10]. MIC, or at least DICs, should have interacted with the rural users (for instance organizing seminars or conducting surveys), and considered their preferences and skills (e.g. ability to use a computer and the advantages of the internet). The government focused on improving aggregate key benchmark parameters such as the penetration rate of telephone and internet access subscribers instead of focussing on the needs of the rural users (e.g. mobile phones and PCs, and provision of IT training courses to improve their acknowledge about the benefit of using the internet (Long, 2010)). Thus, many rural users gave up using telephony and the internet access, when the government stopped to pay subsidies.[11] According to the vice director of the DIC 'the main reason for a low uptake was lack of demand. Rural users, particularly those who lived in isolated and mountainous areas were not aware of the benefits of the internet. Public internet access centres were mainly used for playing games'.

On the other side, due to the lack of cooperation among DICs, telecom providers, and VTF in supervising the provision of universal service led to overlapping provisions. One household could receive subsidies from two or three providers for installing and using telephony service (one household could subscribe to two or three telecom providers). In this way, the government spent a double or triple to subsidise to connect one household (Lam, 2013).

Although telecom providers received funding from the government to provide users with universal service, they did not clearly declare in their promotion programs whether the service came from government subsidies or from their own budget.[12] They made rural dwellers understood that all the subsidies came from telecom providers' budget and not from the government.

3.2.3. *Layer 3*

Layer 3 is a formal institutional environment of socio-technological systems. It includes legal rules, laws and regulations, and constitutions that introduce the formal rules of the game (J. Koppenjan & Groenewegen, 2005). Formal rules relating to universal service was not in existence in Vietnam before 1995 (Lam, 2013). Telecommunication services at that time were not prevalent and only used by state-owned enterprises and other organizations (Lam, 2013).

Vietnam began the reformation and liberalization of telecommunications market in 1995 by splitting up the regulatory and business

[6] Telecom providers had to provide VTF financial contribution that relied on their annual revenue (Decision 191/200/QD-TTg, and 186/2007/QD-TTg). Available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

[7] Circular 05/2006/TT-BBCVT. Available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

[8] Ibid.

[10] Decision 74/2006/QD-TTg.

[11] The government funded rural dwellers end devices (telephone sets, or modems to connect to the internet), and part of installation and monthly subscription fee of universal service. However, due to no having demand they stopped using telephone and the internet service when the government ended the subsidy (Report on the results of the Program 74:pg 27, MIC-2012).

[12] Ibid.

function from the Department General of Post and Telecommunications - DGPT (a governmental body, predecessor of MIC today), establishing a state-owned company - VNPT, and granting licenses to new entrants (Viettel and SPT).

Along with the telecommunication liberalization, in 1995 universal service was initially considered, however, the definition was quite simple and no specific objective was addressed.[13] The regulatory framework for universal service has been gradually built up since the Bilateral Trade Agreement between Vietnam and the United States was signed in 2000 (Lam, 2013: 154), and American telecom providers were entitled to invest in the Vietnam telecom market. The telecommunication market was opened up for foreign and domestic competitors. All telecom providers were on a level playing field, and the government could not allow VNPT (the first state-owned telecom-post company in Vietnam) to apply the cross-subsidy regime to deliver universal service. Furthermore, in the light of international commitments on competition from the World Trade Organization (WTO) and General Agreement on Trade in Services (GATS) on basic telecommunications (Ha et al., 2005), in 2005 the government had to give up the price support regime for state enterprises and look for other tools to finance universal service (by setting up VTF and introducing the Program 74).

In 2002, the Standing Committee of National Assembly passed the Ordinance on Post and Telecommunications (43/2002/PL-UBTVQH10) in which regulation of universal service was addressed. Although a more precise definition of universal service was offered, no type of universal service was addressed at all.[14] Up to 2006 the government issued a plan to provide universal service (the Program 74) and at that time universal service was clearly defined as PSTN telephone, dial-up/broadband internet, and emergency calls. Based on this MIC introduced a package of legal documents and decisions to guide its subsidiaries (VTF and DICs) and telecom providers to implement the Program 74 (around 40 different documents within 5 years 2006-2010[15]).

In this formal institutional environment, the Program 74, the Decision 191/2004/QD-TTg (Decision 191) and the Circular 05 could be seen as the most important regulations providing a policy framework for the interactions between actors (as analysed in level 2) as well as the tasks that these actors had to perform. The Decision 191 permitted MIC to establish VTF to manage and supervise subsidies as well as to collect financial contributions (mostly from telecom providers). The Circular 05 regulated all tasks that VTF, DICs, and telecom providers had to do for the provision of universal service (as described at Level 2).

However, the utmost important factor here influenced all these law and legal regulations mentioned above was directives of the Communist Party of Vietnam-CPV (Lam, 2013). CPV is not a legislative body, neither an executive entity, and nor a judicial branch, however Article 4 of the Constitution promulgates that CPV leads the State and society.[16] Hence, their policies affect all aspects of the society, from the highest legislative body (the Vietnamese National Assembly) and the highest administrative body (the central government) to the lowest administrative level (communes). Chief officials at all levels are selected and appointed by CPV (Lam, 2013). Policies in the telecom sector are also influenced by policies of CPV. In 2000, CPV introduced the Directive 58-CT/TW (Directive 58), namely "Enhancing the application and development of ICT to support the national industrialization and modernization"[17] in which CPV addressed targets that basic telecommunications (and postal) services would be achieved by the end of 2010. Based on this directive, the central government built up telecommunication and post developments strategies as well as other social - economic development strategies (Decision 158/2001/QD-TTg)[18](Lam, 2013, p. 173). It can be said that this Directive paved the way for Vietnam to open its telecom market.

3.2.4. Layer 4

Layer 4 is an informal institutional environment of social-technological systems including the informal rules (culture, values, norms, and attitudes) of the game and they have influences on the mind-set of actors in level 1 (J. Koppenjan & Groenewegen, 2005).

The rule of law in Vietnam was influenced by a complex mixture of neo-Confucian concepts of 'virtue', French colonial legality, and revolutions (Gillespie, 2007, p. 137). The main idea of the Confucian concept is that if people lived in harmony and morally together, laws were unnecessary (Gillespie, 2007, p. 139). According to Gillespie (2007:140), this idea affected the Vietnamese elite via ritual principles and draconian panel laws in controlling social behaviour. Even leaders of CPV used a revolutionary morality to interpret and lead the state and society (Gillespie, 2007, p. 142). As the French invaded Vietnam last century, they set up a law system based on their ideas in order to maintain colonial administration (Giao & Ng, 2011, p. 284). Although, Vietnam today has gone out far away from the war and adopted a rule of law state, Confucian virtue ideas still influence norms and orientations in society (Giao & Ng, 2011, p. 284).

The administration system in Vietnam, affected by French colonial legality, is divided into three levels: province, district, and commune.[19] At the provincial and the district level, they have departments or divisions that manage and supervise all activities relating

[9] Circular 05/2006/TT-BBCVT: Guidelines for deploying the program on provision of public telecommunications service till 2010. Available at http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

[13] Article 13 Section 2 of the Degree 51/CP only regulated that: VNPT enables provision of basic telecommunication services in whole country (including the isolated and mountainous areas).

[14] Article 49 of the Ordinance of Post and Telecommunications stated that 'universal service/public telecommunication service includes universal telecommunications service and mandatory telecommunications service. Universal telecommunications service is telecommunication services that are provided to all people and have to follow the standard of quality and price ruled by state-authorized agencies. Mandatory telecommunications service is telecommunications services provided by the government's request in order to facilitate the social - economic development and enable security and defense'.

[15] At http://mic.gov.vn/vtci/Pages/ThongTin/114206/Cac-van-ban-lien-quan.html.

[16] The Vietnam Constitution in 2013.

[17] Available at http://mic.gov.vn/Pages/vanban/chitietvanban.aspx?IDVB=10191 (in Vietnamese).

[18] Decision 158 issued on October 18th, 2001 by the Prime Minister - Approving the national development strategy on Posts and Telecommunication to 2010 and orientation to 2020. Available at: http://mic.gov.vn/Pages/vanban/chitietvanban.aspx?IDVB=9477 (in Vietnamese).

[19] Law on Organization of Local Administration (77/2015/QH13).

to society, economy, security, culture, etc. within in their jurisdiction [20]. As such, DIC as a department of provincial governments is responsible for all ICT activities in their province (each province has one DIC).

Furthermore, the precept of law and legal regulations in Vietnam was also significantly influenced from the Soviet legal systems in 1960s, and the Western capitalist economy since 1986 (Gillespie, 2007). In which Marxist-Leninist perspective praised public needs over individual interests, treated laws as tools to maintain social order, and preferred top-down control approach (Gillespie, 2007, p. 142). In 1986 Vietnam faced big challenges of society and economy that could lead to the fall of the country. On this background they unleashed the private sector and introduced the Western ideas of legality (Gillespie, 2007, p. 146).

With regard to formulating universal service policies, it seems that the Western ideas had an influence on level 3 (formal institutional environment) rather than the other ideas. However, the most influence was the pressure of the integration of the world economy. This is illustrated via the Directive 58. Due to the concern of lagging far behind other countries in Asia, CPV introduced the Directive 58 to strengthen the competence of companies as integrating with the world economy. CPV called for building up policies to facilitate competition and promote various actors to participate in the market (Section 2.4 of the Directive 58). They requested the Vietnamese government to must legalize their initiatives for development of ICT in order to apply nationwide, and control tightly the deployment (Section three of the Directive 58). They also asked leaders of CPV at lower levels[21] to must formulate strategies to implement this Directive (Section three of the Directive 58). Based on this Directive, the central government built up telecommunication and post developments strategies (Decision 158/2001/QD-TTg).

4. Discussion

The issue of promoting Internet access and other telecom services has been a policy issue in almost any country. According to UN at least 134 different plans were in force in 2013 (Liu, 2016). The approaches in these plans differ from country to country, but provision of universal service in rural areas is generally addressed, and it is widely recognized that some kind of public intervention, e.g. in the form of public funding, is needed in order to solve the issue. In US and the European Union efforts are made to minimize direct intervention and leave as much as possible to the market forces. Still there are a substantial number of public funded programmes offering public support for development of telecom in less favoured regions.

East Asian countries have a tradition for more direct government intervention than what is seen in US and in Europe. This applies not only to socialist countries such as China and Vietnam, but also to market economies like the ones in Japan, Singapore and South Korea.

In the case of Vietnam, it can be said that the formal institutional factors at Level 3 played a critical role in formulating universal service policies in Vietnam, in which the international agreements (Bilateral Trade Agreement signed with the US and commitments from WTO) played a leading role and the CPV's directives played a guarantee role. In the other words, universal service policies in Vietnam was deeply rooted from the international agreements and the directives of CPV. Under the pressure of the integration of with the world economy Vietnam had to open up their telecommunication market for foreign and domestic competitors, and gave up the cross-subsidy mechanism and establish VTF to support providing universal service. However, to switch from a monopoly regime controlled by one party to a competition regime with various actors entering the market the role of CPV was critical. As a former General Director of DGPT said that the Directive 58 removed concerns of CPV's leaders and the State about national security. As a guarantor, it backed up for the government to negotiate with the United States and WTO later to open the Vietnamese telecommunication market.[22] This Directive encouraged the application of ICT into all fields of economy and society, from production and management to reducing poverty. Moreover, he also said that many ideas of this Directive were reflected in the Ordinance on Post and Telecommunications in 2002 (now replaced by the Law of Telecommunications in 2009).

The ruling party's directives seemed to be extremely important for boosting the execution of policies in countries favouring a top down approach with an administration-based mechanism, like Vietnam and China where these parties appointed officials and administrators both in government entities and key state-owned-enterprises at various levels. Here, success or failure in implementing the parties' policies remarkably affected enterprise leaders' political career (Liu, 2012). Hence, on the one hand, provision of universal service may develop much further when these state-owned-enterprises are under pressure from the party. This idea is demonstrated in the case of Vietnam and China. As the communist parties had policies on development of ICT in Vietnam (the Directive 58), or the project of ‘New Socialist Countryside’ in China, the entire governmental systems had to carry out instantly. In Vietnam, the Prime Minister specified the Directive by issuing the Program 74, and then MIC introduced the Circular 05 to deploy the Program 74 and ordered state-owned-telecom providers to provide universal service. In China, Ministry of Information Industry launched the ‘Village Access Project’ and assigned six state-owned-carriers and provinces to execute as well as to seek funding (Jayakar & Liu, 2014). As a result, two countries achieved significantly success in short time: Vietnam, after five years, reached 16 lines per 100 inhabitants (increased threefold from the initial objective); the penetration of the internet was 0.32% in 2009 (increased almost twofold compared to that in 2004); 97% of communes had at least a public telephone centre; in China, after almost four years, 99.5% of its total administrative villages were connected (Xia & Lu, 2008).

However, on the other hand, the ruling party's directives also caused some issues. In other words, a top-down approach not based on a market-oriented mechanism could lead to a gap between universal service provided by central planning and local needs. In Vietnam, at Level 2 the interactions among the actors based on the administrative mechanism, lack of contractual relations (Williamson, 2000)

[20] Ibid.

[21] CPV members occupy all senior management positions at government entities and state-owned enterprises.

[22] Available at: http://ictnews.vn/kinh-doanh/ho-so/mo-cua-thi-truong-vien-thong-vua-ly-tri-vua-tinh-cam-31105.ict.

based on the market principles between MIC/VTF/DICs and telecom provider (except the credit contracts between VTF and telecom providers) and insufficient delineation of responsibility between MIC and DICs (or the dependent of DICs on MIC's directives on the deployment of the Program 74). It led to the gap between the universal service delivered with rural users' needs.[23] Besides, one household could receive subsidies from two or three operators for installing and using the service. In China, these issues also occurred. The central government focused on increasing rural income and introducing advanced agricultural technology, meanwhile the provincial governments favoured providing advanced information services (Ting & Yi, 2013), and the fragmentation between ministerial or provincial initiatives led to incompatibilities between these initiatives' outcome (Xia, 2010).

In other countries with a more market-led approach, like South Korea, Japan or Singapore, the central government also played a critical role and intervened directly into the market. In all these countries government officials are able to exercise strong direct influence on strategies and decisions made in private industry. Here, a top-down approach has been supplemented with the use of market-oriented mechanisms. In addition to direct intervention, other remedies such as: facilitating competition; the participation of private sector, and research institutes and universities; and paying much attention to users (Choudrie & Lee, 2004; Lee, O'Keefe, & Yun, 2003) have made a big contribution to the success of South Korea. A similar success has not yet been seen in Vietnam. The deficiency may probably explain for the gap between universal service provided by central planning and the local needs in Vietnam where there was no direct interaction between the central government and rural users. The participation of private sectors could reduce the government's budget deficit and deliver better services at lower costs (Koppenjan & Enserink, 2009) and the participation of users may ensure that the provision of the universal service actually fit with current needs.

5. Conclusions

Based on the four-layer model of Koppenjan and Groenewegen (2005), the paper points out that formal institutional factors (the international agreements and the directives of CPV) remarkably influenced on the formulation and implementation of universal service policy (the Program 74) in Vietnam, in which the international agreements played a leading role and the CPV's directives played a guarantee role. This research also shows that the interactions between these actors in deploying the Program 74 were transacted via administrative orders, no contractual relations, however their cooperation was quite loose. The formulation and implementation of the universal service policy were mainly concentrated on action at levels 2 and 3.

The ruling party's directives in an administrative regime seem to be efficient with regard to forcing State-controlled actors (governmental entities and State-owned providers) to deploy universal service programs and to reach predefined targets. However, there was a gap between universal service delivered and the users' needs and the objectives of the central government. Therefore, directives seem to be inefficient with regard to meeting market needs, and the results may turn out to be unsustainable in the long run.

In Asia, many countries like South Korea and Japan have been more successful in their policies as they have supplemented a top-down approach with other initiatives such as promotion of competition, participation of private actors and research institutes and universities, and paying attention to end-users.

In countries like Vietnam, where one party controls the government and the society, all major telecom providers are state-owned enterprises, the participation of the civil society is limited, and there are no checks and balances. In this circumstance, from institutional views, the government should ensure the participation of the private sector, research institutes and universities, and rural users. The private sector has a stronger incentive than the public sector to reduce costs and improve quality or innovate (Shleifer, 1998) – especially in a competitive environment. Hence, their involvement will improve the efficiency of universal service programs. The government should therefore deregulate and decentralize approaches towards implementation of a universal service program in order to reduce the costs of the transactions and remove barriers of entry to the market.

These recommendations are in line with recommendations for liberalization made in other countries as well. However, they collide with parts of the existing institutional framework in Vietnam – especially at informal institutional environment at level four. It is therefore important to support a bottom-up approach with clearly defined contractual relations.

The government should set up and force the contractual relations between governmental entities (like DICs or VTF) and telecom providers in order to promote both competition and provision of universal service. Establishment of the contractual relations will enable the implementation of the contracts between actors as well as increase the enforcement in providing universal service. In other words, the contractual regime strengthens the rules of law by forcing actors follow the rules that is the weakness in developing nations (Laffont, 2005).

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[23] MIC offered universal service they had (such as voice telephony services and dial up internet access), not service inhabitants needed (such as mobile phone services and PC; or delivering them IT training courses on the benefit, knowledge, and skills using IT (Long, 2010). Finally, many households gave up using telephone service when Program 74 stopped funding. As a vice director of a DIC said 'MIC could not understand rural dwellers' preferences and characteristics as DICs do. The provision of universal services would have been more effective if MIC had decentralized their budget and rights in deploying the program'.

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Universal service in Vietnam: The role of government

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Abstract

Purpose - *This paper looks at the universal service policy in Vietnam interval 2005-2010 from a stakeholder perspective in order to clarify the role of stakeholders as well as initiatives used to implement the policy.*

Design/methodology/approach - *The paper applies the stakeholder framework of Papazafeiropoulou and Pouloudi (2000) to identify which actors implemented the universal service policy and what initiatives used by the central government. Additionally, the paper also employs the qualitative method to clarify the stakeholders' position on performing the universal service policy. The qualitative interview is recruited to verify and triangulate the result of the secondary data.*

Findings - *The paper finds that: (1) the Vietnamese government controlled the universal service policy via an administrative regime that the central government ordered and other stakeholders followed; (2) the universal service policy focused much on delivering universal service and infrastructure, however lack of initiatives rising awareness of rural users about benefit of the internet, or training courses on improving rural users' skills to use the internet; (3) stakeholders implementing the universal service policy were state entities in which the national government played a central role, no any involvement of private sector and civil society.*

Originality/value - *Little research on universal service policies in Vietnam has been made. By analyzing the Vietnamese case, achievements and drawbacks in implementing universal service policies are identified and lessons for other developing countries are derived.*

Keywords *Universal service, Stakeholders, Government, Initiatives, Vietnam*

Paper type *Research paper*

1. Introduction

Today information and communications technology (ICT) in general and telecommunications realm in particular plays a vital role in social and economic development across countries. Promoting the application of advances of ICT to build the Information Society as well as to achieve the Millennium Development Goals is one of the critical missions that the International Telecommunication Union has suggested nations to carry out (WSIS, 2003).

In past years, there has been profound research on universal service, especially concentrating on study of the role of government/policy (Samarajiva, 2000; Lee, O'Keefe and Yun, 2003; Gillett, Lehr and Osorio, 2004; Lee and Chan-Olmsted, 2004; Fan, 2005; Frieden, 2005; Gillwald, 2005; Falch, 2007; Picot and Wernick, 2007; Lam, 2013) or finding the models/tools furthering the penetration rate of universal service (Peha, 1999; Falch and Anyimadu, 2003; Long, 2010). However, there are only few studies on the role of stakeholders in implementing the provision of universal service, especially research in the role of the central governments in developing countries and their initiatives used to enhance the development of universal service.

This paper examines the role of stakeholders in carrying out the universal service policy and their strategies in Vietnam in 2005-2010 in order to identify their impact and relationships on performing the policy. The paper attempts to answer following questions:

1. Who participated in the implementation of the universal service policy in the period 2005-2010 in Vietnam, and what kinds of initiatives were applied?
2. What kind of policy initiatives should be recommended to the Vietnamese government?

The paper employs stakeholder theory to categorize the stakeholders who took part in deploying the universal service policy in Vietnam. Based on qualitative methods, the authors analyze secondary documents and conduct interviews with officials working in the Vietnamese Ministry of Information and Communications, Departments of Information and Communications, the Vietnamese Public Utility Telecommunications Service Fund, and local telecom providers.

The paper is structured as follows: Section 2 presents the theoretical framework and research methods, section 3 highlights the telecommunications market in Vietnam; section 4 analyzes key stakeholders; and section 5 provides discussion, conclusions, and a few recommendations

2. Theoretical framework and research methods

2.1. Theoretical framework

The stakeholder theory introduced by R. Edward Freeman has nowadays become a central component of management theory (Mitchell, Wood and Agle, 1997; Harrison and Freeman, 1999). According to Freeman (2010, p.46), a stakeholder is 'any group or individual who can affect or is affected by the achievement of the organization's objectives'. To manage organizations effectively, it is indispensable to take stakeholders into account in a systematic fashion (Freeman, 2010). However, this theory is applied and explained in various ways with diverse and often contradictory evidence and arguments (Donaldson and Preston, 1995). To make this theory more clear, Donaldson and Preston (1995) categorize it into three distinct types, as descriptive/empirical, instrumental, and normative in which the normative is fundamental. Mitchell et al. (1997) categorise stakeholders by their attributes, like: power, legitimacy, and urgency to generate a typology of stakeholders including: domain stakeholder, discretionary stakeholder, demanding stakeholder, dominant stakeholder, dangerous stakeholder, dependent stakeholder, definitive stakeholder, and non-stakeholder. They call this the 'theory of stakeholder identification and salience'.

Although, the stakeholder theory is primarily applied for analysis of private companies, the insights can be applied in part in public sector settings as well, particularly within e-government services (Scholl, 2001). Based on the stakeholder theory by Freeman, many scholars have designed approaches/frameworks to explore views/roles of stakeholders in inter-organizational systems and in information systems (Pouloudi and Whitley, 1997; Papazafeiropoulou and Pouloudi, 2000). More practically, various researchers have applied this theory to analyze the role of stakeholders in the implementation of policies, or in the running of a system. Choudrie and Papazafeiropoulou (2003) apply the stakeholder theory to examine strategies used by the government in diffusing broadband take-up in South Korea. Luk (2009) and Scott et al. (2004) use this theory to look at the success and failure of e-government systems in Hong Kong and Ireland respectively. Zhang, Dawes and Sarkis (2005) explore stakeholders' potential benefits of and barriers to inter-organizational knowledge sharing in an e-government setting.

Studying attitudes and expectations of multiple stakeholders as well as the involvement of the widest players might reduce conflicts and increase the rate of success in implementation of information system (Papazafeiropoulou and Pouloudi, 2000; Scott, Golden and Hughes, 2004). Hence, application of this theory as a tool to identify and to analyze the impact of stakeholders in the field of ICT is useful.

Based on the categorization of King et al. (1994) on government intervention in IT innovation and the categorization of the environment (institution and regulation) layer of Damsgaard (1996) (Choudrie and Papazafeiropoulou, 2003), Papazafeiropoulou and Pouloudi (2000) apply the stakeholder theory to analyze the roles of stakeholders in the electronic commerce market. They recognize five groups of stakeholders in this market:

- The national government
- International organizations
- Policy intermediaries
- Companies, and

- Customers/citizens

Furthermore, they also design a web of stakeholders that demonstrates the relations among these stakeholders via national strategies.

Figure 1: The web of stakeholders (Papazafeiropoulou and Pouloudi, 2000)

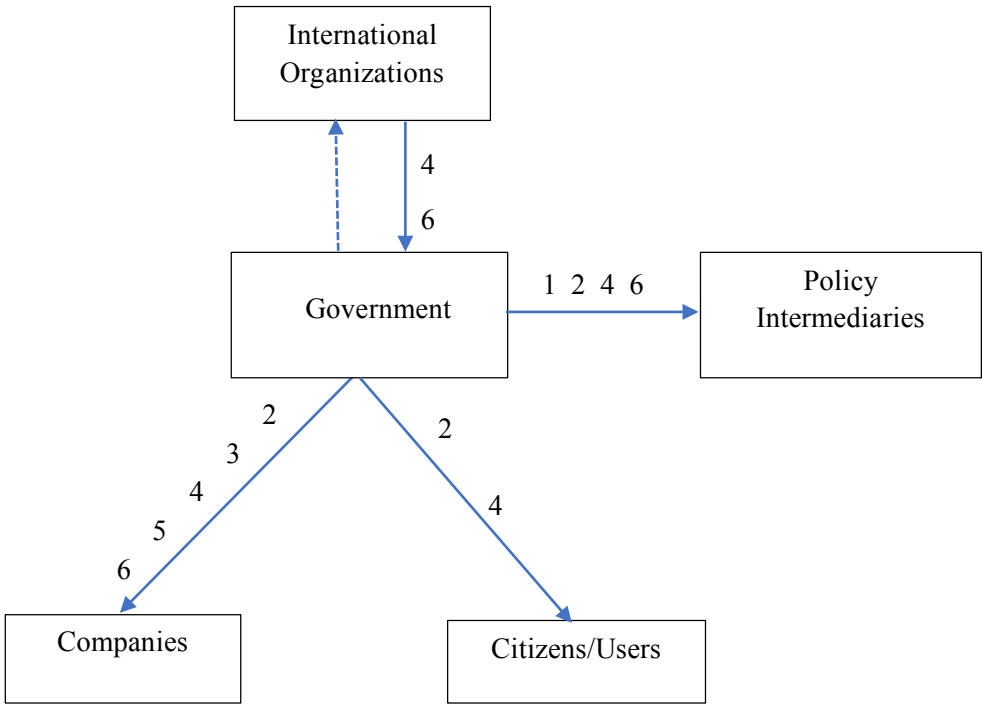

Figure 1 depicts five groups of stakeholders and the relations among them via six types of national strategy (King *et al.*, 1994):

1. 'Knowledge building' is undertaken to provide the scientific and technical knowledge base required to produce and exploit innovations, e.g. funding of universities and research.
2. 'Knowledge deployment' is used to stimulate the dissemination of new knowledge, e.g. provision of education to the population; encouragement of already knowledgeable individuals and organizations to come into a country or region and establish operations; training a cadre of potential users.
3. 'Subsidy' is financial support for actors involved in the electronic commerce innovation.
4. 'Mobilization' basically means the encouragement of decentralized actors and organizations to think in a particular way with respect to an innovation, e.g. promotional and awareness programs or advertisement to support the use of innovations.
5. 'Innovation directive' is a command to produce innovations, to use them, or to engage in some activity that will specifically facilitate production and/or use.
6. 'Standard setting' is a form of regulation aimed at constraining options of decentralized actors and organizations in line with larger social or institutional objectives.

The figures in the web present six types of national strategies that stakeholders can apply to impact other stakeholders. This paper applies the framework to analyze the role of stakeholders as well as to demonstrate the relations among them in the deployment of the universal service policy in Vietnam.

Although this web places the government in the center and the arrows only go out from the government to other stakeholders, it is useful to look at the relationships among other stakeholders as well (Choudrie and Papazafeiropoulou, 2003).

2.2. Research methods

To identify stakeholders and their relationships, this paper is applying the stakeholder framework of Papazafeiropoulou and Pouloudi (2000). The paper uses a qualitative method to clarify the stakeholders' impact and position on performing the universal service policy. Almost all data was mainly collected from the Vietnamese Ministry of Information and Communications (MIC), the Vietnamese Public Utility Telecommunications Service Fund (VTF), and some incumbent providers in Vietnam. Eight officials were interviewed, this includes two officials from MIC, one of them is a former director of VTF; two local government officials (Department of Information and Communications - DIC); two officials from VTF; and two telecom providers' managers. These interviews were carried out face to face and lasted from one to two hours. Almost all these interviews were recorded and made note for ensuring validity and reliability of the data.

In addition, available secondary e.g. from specialty newspapers have been applied and triangulated with data collected from the interviews.

The definition of universal service is various across countries. This paper uses the same definition as the Vietnamese government did in 2005-2010. Universal service in Vietnam (or the so-called public telecommunications service) included universal and mandatory telecommunications services. Here the universal telecommunications service was defined as standard telephone service and standard Internet access service; the mandatory telecommunications service included mainly emergency calls. The targeted subjects of this policy were individuals and households living in communes having the tele-density under 2.5 lines per 100 inhabitants (Decision 74 issued on April 7th, 2006 by the Prime Minister).

In this paper, stakeholders were analyzed in the period of 2005 - 2010, in this period the Vietnamese government deployed the 'Program on provision of public telecommunications services until 2010' (hereafter in the Program 74). The Program 74 is considered as the first universal service policy program in Vietnam. The provision of universal service was almost delayed in following years. Until 2015, the government issued the second program 'the Program on provision of public telecommunications services until 2020' (Decision 1168 dated on July 24th, 2015).

3. Overview of the telecommunications market in Vietnam

Like other countries, Vietnam has reformed and liberalized its telecommunications market since 1994. They separated the regulatory and business function from the Department General of Post and Telecommunications - DGPT (a governmental body, predecessor of MIC today). Consequently, DGPT was responsible for making telecommunications and post policy, and regulation. Vietnam Posts and Telecommunications Corporation (VNPT), a state-owned-company was in charge of business in telecommunications and post field (previously, VNPT's business activities did follow the directions of DGPT). In 1995, the government ended the monopoly of VNPT on provision of telecommunications services as it granted licenses to two new entrants (Viettel and SPT). In 1997, two other companies were licensed to provide internet services (FPT and Netnam).

The telecommunications development goals in Vietnam from 1996 to 2020 extracted from the national development strategies in periods 1996-2000 (Decision 110 issued on February 22nd, 1997), 2001-2010 (Decision 158 issued on October 18th, 2001), and 2011-2020 (Decision 32 issued on July 27th, 2012) are demonstrated in Table 1.

Table 1: Overview of the telecommunications development goals

Indicators	1996-2000	2001-2010	2011-2020
Fixed telephone subscriptions per 100 inhabitants	5	16	25
Mobile telephone subscriptions per 100 inhabitants	-	26	140 (in 2015)
Internet subscriptions per 100 inhabitants	-	12	20 (fixed broadband internet) 40 (mobile broadband internet)
Proportion of households with fixed lines at home	-	-	45
Proportion of households with internet access at home	-	-	40
Proportion of communes with fixed lines	almost	100	100
Proportion of communes with internet access	-	-	100

-: no data

Source: MIC (Decision 110, 1997; Decision 158, 2001; Decision 32, 2012)

Figures in Table 1 show the ambitious targets of the Vietnamese government, especially for mobile phone and internet service in different periods. When Vietnam set up the first telecommunications development strategy (Decision 110, 1997), there was the only objective that the national tele-density should reach 5 fixed lines per 100 inhabitants before year 2000, there were no targets for other kinds of telecom services. However, five years later, in 2001 the target for fixed lines until 2010 was raised to 16 phone sets per 100 inhabitants, the targeted penetration of internet subscribers was set to 12 percent, and the target for mobile phone subscriptions was set to 26 percent (Decision 158, 2001). In 2012, Vietnam defined even higher targets to be fulfilled by 2020. The penetration rate for fixed broadband internet should be 20, the percentage of mobile broadband internet subscriptions should be 40 and the target for mobile telephone subscriptions should be 140 percent (Decision 32). In 2012, Vietnam was ranked the 10th in Asia in terms of the volume of internet users.

Vietnam did not emphasize on specific universal service goals, before 2005-2006, where the first universal service policy was introduced (the Program 74). VTF, an entity belonging to MIC, was established in 2005 to support the provision of universal service. Subsequently, in 2011 the second program on the provision of universal service was approved by the Prime Minister and would have been deployed in a five-year-interval, from 2011 to 2015 (Decision 1643 issued on September 21st, 2011 by the Prime Minister). However, this second program was postponed and reformulated due to underestimation of the pace of technology development, and lack of compatibility with other existing ICT infrastructure and national rural development policies (Report of MIC on the implementation of the Program on provision of public-utility telecommunications services towards

2010 - Report 74). Ultimately, on July 24th, 2015 the government issued another program, the 'Program on provision of public telecommunications services until 2020' (Decision 1168).

4. Key stakeholders in implementing the Program

4.1. The Program 74

In this section, the paper outlines the key contents of the Program 74 that was deployed from 2005 to 2010.

In response to commitments from the World Trade Organization, in which Vietnam became a member in 2006 and in order to bridge the digital divide between urban and rural areas, the Vietnamese government has focused on developing universal service by eliminating the cross-subsidization mechanism, establishing VTF, and formulating programs on provision of universal service and integrating them into other national programs.

In 2006, the government issued the first universal service policy, the Program 74. The Program 74 was carried out within five years, from 2005 to 2010. The total budget was approximately 260 million US dollars, mainly collected from a share of the annual revenue of incumbent providers: 5% of the revenue from mobile services, 4% of the revenue from international telephone services and international leased - line service, and 3% of the revenue from domestic distant telephone services and domestic leased - line service (since 2007 these rates were reduced to 3%, 2% and 1% respectively - Decision 186 issued on December 3rd, 2007 by the Prime Minister).

The main targets of the Program 74 were that the tele-density should reach 5 phone sets per 100 inhabitants in areas (communes) with a tele-density below 2.5 sets per 100 inhabitants (universal service areas); all communes throughout the country should have at least one tele-center; 70% of communes in the whole country should have at least one public internet access center; and all citizens should have access to the emergency telephone services (Decision 74). This was the first time, Vietnam introduced a clear definition of universal service. Accordingly, universal service, the so-called public telecommunications service in Vietnam, included universal and mandatory telecommunications service. In which, the universal telecommunications service was standard telephone service and standard internet access service; and the mandatory telecommunications service was emergency calls (such as medical first aid, social order and security incidents, fire extinguishment, telecommunications service in searching and rescuing, and preventing and fighting of natural disasters), and fixed telephone number inquiries. The Program 74 benefited all inhabitants and households that either got their own connection or used the services offered at public telecommunications service centers. All beneficiaries living in universal service areas was eligible to receive subsidies from the Program 74 (Decision 74).

After five years, the Program 74 achieved remarkable success: the tele-density reached 16 lines per 100 inhabitants (increased threefold from the initial objective); the penetration rate of internet was 0.32% in 2009 (increased almost twofold compared to that in 2004); 97% of communes in the whole country had at least one public telephone center; and all citizens were free to have access to the mandatory service (Report 74). These achievements made a great contribution to the reduction of the digital divide and facilitated the development of society and economy. To gain such the achievements, the role of MIC, incumbent providers, and other stakeholders were substantial. Moreover, the establishment of VTF has been considered as an ideal starting point to implement reform of universal service provision (Lee, 2011).

However, some objectives of the Program 74 were not met. Merely 55% of communes throughout the country had one public internet access center and only 40% of households in universal service areas had a fixed-line (Report 74). The type of universal service was still limited as majority only had dial up internet access (Decision 43 issued on November 2nd, 2006 by MIC). The provision of universal service was mainly implemented via form of 'order place' or 'plan assignment'[1] not by bidding/auction regimes to select the lowest subsidy telecom providers offer (Circular 05/2006/TT-BBCVT).

4.2. Initiatives and key stakeholders implementing the Program 74

4.2.1. Initiatives implemented in Vietnam

In this section, the authors analyze initiatives implemented by the Vietnamese government and look at stakeholders in deploying the Program 74 to clarify their role.

4.2.1.1. Subsidy

To enhance the development of universal service, MIC introduced various types of subsidy for inhabitants, households, and telecom providers.

Regarding inhabitants and households. In order to make access to telecom services affordable for rural users, MIC subsidized dwellers and households living in universal service areas to install telephone and internet connection service. Accordingly, individuals and households paid a reduced installation, the monthly subscription fee was subsidized, and they received end-devices (such as modems and telephone sets) for free. Local inhabitants without their own telephone or Internet connection at home, could access the services available at public tele/Internet centers financed by the government as well. Subsidies were not granted to rural users directly. Instead, telecom providers were compensated by MIC for installing and operating telephone and internet connection services for rural users below the costs.

Regarding telecom providers. To assist telecom providers in delivering universal service, MIC issued Decision 17 dated June 15th, 2007 (the Decision was later replaced by the Decision 40 on July 2nd, 2008). This decision stipulated that telecom carriers should receive subsidies to maintain and develop new telephone/internet subscribers and public tele/internet centers. Basically, this was the funding supported telecom providers to sustain their infrastructure in the unprofitable areas. However, it could not offset the cost of the telecom providers' infrastructure building. This funding was just a catalyst to lead them to preoccupy place prior to their rivalries.

Furthermore, MIC also provided soft loans to these operators to support them to upgrade and develop new infrastructure. However, because the loan procedure was complicated and time consuming, this was not attractive for the operators. The amount of money disbursed reached only 25% of the planned budget (Report 74).

4.2.1.2. Standard setting

'Standard setting' is a form of regulation aimed at constraining options of decentralized actors and organizations in line with larger social or institutional objectives (King *et al.*, 1994).

To deploy the Program 74, MIC issued the Circular 05 asking DICs, VTF, and telecom providers to follow its instructions. DICs were the provincial government entities in charge of both making regulation and policy in terms of telecom, post, frequency radio, spectrum license, and the press within their locale. VTF, a body belonging to MIC, had the responsibilities of collecting financial contributions from telecom providers as well as providing them subsidies in compliance with MIC's plans. Telecom providers delivering universal service were state-owned companies providing both telecommunications services and networks.

MIC requested telecom providers who were keen on providing universal service to prepare proposals and then submit to MIC for approval. Telecom providers' plans basically outlined and depicted their capability and budget needed to deliver universal service. These plans also consisted of estimated numbers of fixed lines, internet connections, and public internet access centres to be developed.

On the other side, MIC requested VTF to construct a plan and submit to MIC for approval. This plan should include information on the level of subsidies funding universal service provision to be allocated to telecom providers and how much of incumbent providers' annual revenue that should be collected to cover these expenses. Based on the approved plan, VTF delivered telecom providers funding. Meanwhile, DICs were mandated by MIC to supervise the provision of universal service of

telecom providers. They also verified telecom providers' plans to ensure that these plans were consistent with other provincial ICT initiatives within their areas.

Indeed, the role of DICs was relatively modest. They could not supervise telecom providers to execute the provision of universal service or to adjust the Program 74 if this Program did not fit with the need of rural inhabitants in their province. As an official of MIC said 'the participation of DICs in verifying the amount of universal service delivered by telecom providers was late (due to no detailed instructions from MIC). Hence, this impacted supervision and delivery of subsidies to telecom providers'. Additionally, a vice director of one DIC in an interview conducted in July 2015 said 'Many of our ideas in terms of improving provision of universal service were not considered by MIC. Consequently, some of the universal service provided was not appropriate with rural users' demand".

4.2.1.3. Knowledge building, Knowledge deployment, Mobilization, and Innovation directives

The Vietnamese government did not deploy any initiatives to support research institutes or universities to do research in matters related to universal service. Neither did they take any initiatives to improve rural users' knowledge about the internet, for instance through provision of training courses. This was the first time universal service provision was addressed by the government. The budget was limited, and Vietnam did not have adequate experience to deploy this kind of program. They did not stimulate research and development in universal service such as which technology or types of universal service that were best suited to meet local users' demand. The government only implemented some simple ways to subsidize rural dwellers and telecom carriers.

In 2009, although MIC and Bill and Melinda Gates Foundation (BMGF, a non-government organization) cooperated to run a pilot project to improve the computer usage and the internet access ability of rural dwellers. The total budget of this project was 2.6 million USD aimed at equipping PCs and delivering training courses to staff of 99 public tele/internet centers and community libraries in 3 provinces (Thai Nguyen, Nghe An, and Tra Vinh province). This pilot project also coordinated with these libraries and public telecommunications centers to organize events for local dwellers about the benefits of the internet. This project was not part of the Program 74 and did not make a considerable contribution on rising awareness of all rural users about advantage of the internet in the whole nation. However, it also got the involvement of MIC, DICs, VTF, and two major telecom providers in subsidizing provision of internet connection to 99 public tele/internet centers and community libraries (VNPT and Viettel funded these libraries and public internet centers at least 50% of monthly connection fee).

4.2.2. Stakeholders

This section shows how the stakeholders carried out the Program 74 or how the initiatives mentioned above related to these stakeholders.

4.2.2.1. The government

At the national level, MIC played a critical role in formulating and deploying the Program 74 and influenced other stakeholders via these initiatives depicted above. In 2005, MIC established VTF to support delivering universal service to rural areas. This was done to meet the requirements of international agreements (WTO and the Bilateral Trade Agreement between Vietnam and the United States), and to promote further the provision of universal service in rural areas. In 2006, MIC submitted to the Prime Minister the Program 74 to provide universal service. The Program 74 provided subsidies targeted to inhabitants and households in universal service areas. This program also offered telecom providers soft loans to develop infrastructure as well as subsidies to maintain public internet access centers.

Following approval by the Prime Minister, MIC clarified the Program 74 by issuing a series of decisions and legal documents to instruct and guide other actors to implement the Program 74

(around 40 different documents were issued by MIC within 5 years 2006-2010). In an interview in 2015, an official of MIC, who participated in the management and supervision the Program 74, said that 'Apparently, MIC played an important role in building up and instructing other actors to implement the Program. Besides, the role of telecom providers was also critical. If MIC had not formulated the Program 74, and telecom providers had not followed MIC's instructions, the Program 74 would not have been carried out and the rural users would not have been able to enjoy the universal service as now'.

4.2.2.2. Policy intermediaries

According to Papazafeiropoulou and Pouloudi (2000), policy intermediaries are organizations acting between government and companies or citizens (not between providers and end consumers). As such, in the Vietnamese case, policy intermediaries were the incumbent operators.

One of the key factors leading to the boom in universal service provision was the fierce competition between telecom services providers. In which the subsidy from the government was a catalyst leading them to enter the rural market.

In that period, there were nine carriers licensed to provide telecommunications services. Due to the infrastructure competence, only four operators took part in supplying universal service: VNPT, Viettel, Electricity Telecom Company (ETC) and Vietnam Maritime Communication and Electronics (Vishipel). In which, Vishipel was funded to provide universal service to fishermen. The rest were assigned to deliver universal service to citizens living in rural and mountainous areas.

With the position as a dominant operator equipped with an infrastructure with national coverage, VNPT had a great advantage over its competitors in providing telecommunications services. However, this position was strongly shaken by emergence of Viettel and ETC. In 2004, Viettel started to provide mobile phone services[2,] and in 2005 ETC was the first player to introduce the GSM-fixed-wireless-phone (a new device in Vietnam at that time). In order to attract more customers or citizens Viettel and ETC introduced several promotion programs, such as: abolishment of installation fees, free subscription the first 3 - 12 months (or longer, depending on each promotion program of these carriers), and free for telephone sets. Under the high pressure of these rivals, VNPT had to reduce the price of telephony and mobile services and adapt the way charging mobile phone service, shifting from charging phone-calls per minute to charging for the first one minute and every 6 subsequent seconds time.

The provision of the GSM-fixed-wireless-phone in Vietnam was also a reason behind the growth of telephone subscribers in rural areas, especially after VNPT and Viettel also introduced this device in 2007. This phone helped consumers easily to bring anywhere with a certain distance. Besides, the subscription and calling fee was the same that of the fixed line service.

By intense competition between these providers and the subsidy from the government, the volume of telephone subscribers increased considerably. In the period 2005 - 2010, VNPT acquired 1 million telephone subscribers, Viettel 1.2 million and 400,000 telephone subscribers for ETC (Report 74). This made a great contribution to the growth in tele-density in rural and remote areas from 2.5 lines in 2004 to 16 lines per 100 dwellers at the end of 2010.

4.2.2.3. Users/Households

Basically, the Program 74 brought a great benefit to rural dwellers. According to the Report 74, till the end of 2010 more than 20 million inhabitants (appropriately 24% of population in Vietnam) in 4,349 communes across the country got subsidy from this Program. They did not only get support for getting telephone sets and modems, but also the monthly subscription fee was subsidized. Moreover, citizens living in mountainous and isolated areas were also accessible to more than 3,000 tele-centers as well. However, they could not receive directly subsidy from the government, instead telecom providers would grant them.

Figure 2: The relations between the stakeholders in implementing the Program 74

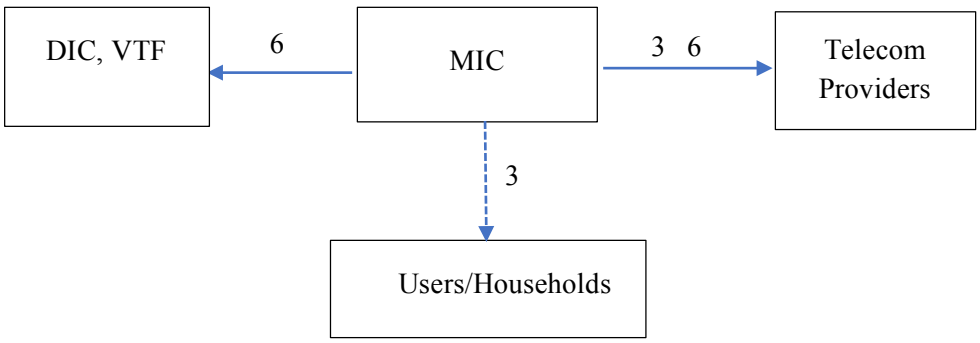

Table 2: Description of the relations between MIC and other stakeholders

Relations	Forms
MIC - Telecom providers	Subsidy and provision of soft loans, and Standard setting (Regulations)
MIC - Citizens	Subsidy (not direct, via telecom providers)
MIC - DICs and VTF	Standard setting (Regulations)

5. Discussion and conclusions

This paper analyzes the universal service policy in Vietnam by applying the web of stakeholders introduced by Papazafeiropoulou & Pouloudi (2000). The empirical findings show that the stakeholders who participated in the provision of universal service were MIC, DICs, VTF, telecom providers, and rural users. The leading roles were played by MIC and the telecom providers. The paper also indicates that initiatives carried out by the central government (MIC) were mere standard setting (regulations) and subsidy (Table 2).

Figure 2 shows that the initiatives taken by the government in order to provide universal service were regulations. In other words, the provision of universal service was implemented via an administrative regime, in which MIC was an order and other stakeholders were the followers. It is likely that the provision of universal service carried out under this regime in rural areas (the government assigned tasks and state-owned-telecom providers implemented) might be undertaken quickly (because all directors of these telecom providers are appointed by the government. The success or failure in carrying out the state tasks affect their career in future). It is apparent that since Vietnam introduced the first universal service policy in 2006, the usage of universal service was considerably accelerated, the number of telephone subscribers (in 2010) tripled compared with the initial objective of the program (in 2004) and 97% of communes in whole country had at least one public telephone center. To gain such results, MIC and the incumbents carriers (VNPT, Viettel, and

ETC) played a critical role. The role of MIC was considered as a central position in creating the rules of the game and issuing rules for other stakeholders as well. By its jurisdiction, MIC introduced initiatives to subsidize usage of universal service as well as to fund telecom providers to maintain and develop public tele/internet centers and infrastructure. Meanwhile, these state-owned carriers were considered as tools used by MIC to deliver universal service. They, on the one side, had to undertake their tasks (for instance: providing universal service) assigned by MIC. On the other hand, they also had to compete each other to gain more market share and ensure their turnover goal. These missions made their role more important in the chain of the provision of universal services in Vietnam.

Figure 2 also illustrates that Vietnam focused much on subsidies to develop infrastructure, maintain the existence of public tele/internet centers, and to provide rural users with universal service. There was little focus on rising awareness of rural users about the benefits of the internet and provision of training courses improving their skills to use the internet. Focusing only on the supply side might increase the development of universal service in short time, however it will not be sustainable. In the case of Vietnam, many users gave up their subscription, when the government stopped subsidizing subscription. Some rural users used universal services only because it was free of charge.

It is clear from Figure 2 that, all stakeholders participated in the provision of universal service were state entities, there was not any involvement of private sector or civil society, except for the beneficiaries - rural users, who had little influence on the actual implementation of the program.

This administrative regime revealed many shortcomings, such as lack of interaction between MIC and DICs that caused an overlapping in the provision of universal service (due to lack of DICs' supervision, one household could receive funds from two or more telecom providers for using one telephony service/internet service). Universal services delivered was not reflecting rural users' demand. As Lam (2013) argues the top-down model of funding administration in Vietnam led to an ineffective monitoring of the deployment of universal services, due to lack of accountability and responsibility amongst departments involved (between MIC and other ministries) as well as a paucity of transparency in selection of universal service providers. This resulted in ineffective and inefficient subsidies, and unsustainable outcomes.

South Korea also applied a top-down approach to develop the national information infrastructure (IT839) (Shin, 2008). However, their measures relied on influence rather than regulations. They promoted the competition based on deregulation and market principles, and stimulated high-speed Internet businesses by the 'hands-off policy' (source: Park & Lee (2002) cited by Choudrie & Papazafeiropoulou (2003)). South Korea has been one of the leaders of broadband penetration in the world for many years (Lee and Chan-Olmsted, 2004). Moreover, in a free market, private partners play an important role in developing the telecom market. They could reduce the government's budget deficit (Koppenjan and Enserink, 2009) and deliver better services with lower costs, whereas public sector was assumed not to be efficient (Gómez-Barroso and Feijo, 2010). Hence, in the case of Vietnam and other developing nations having features similar to Vietnam, encouragement of participation from the private sector and the civil society as well as adopting an approach based on deregulation and market principles is also to be recommended, if a sustainable universal service coverage is to be achieved.

Notes

1. 'Order place' meant that authorized-state-entities based on their budget and cost of the provision of universal service to address subsidy and sign contracts with enterprises to deliver the service. 'Plan assignment' meant that authorized-state-entities based on their budget and state-owned-enterprises' capability and business plans to assign these enterprises to deliver universal service (Decision 256/2006/QD-TTg).
2. Although Viettel provided landline service (PSTN) in 2003, they initially developed aggressively since 2004 when it supplied mobile phone services, ended the monopoly of VNPT (in mobile phone services) and brought a new charging way to consumers.

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Thai Do Manh; Williams, Idongesit

Conference Paper

Examining actors into boosting the provision of universal service in the Vietnamese context

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Examining actors into boosting the provision of universal service in the Vietnamese context

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Abstract:

Purpose - *The paper looks at the formulation of the BMGF-VN project to examine which actors participated in the formulation of this project, how their interests were translated into this project, and what lessons may be drawn for the formulation and implementation of universal service policy in Vietnam in general.*

Design/methodology/approach - *The paper recruits the actor network theory and qualitative analysis to analyse the BMGF-VN project.*

Findings - *the involvement of non-government actors in formulating and implementing the project, the focus not only on the supply side but also demand side are very important in formulating and implementing universal service policy.*

Originality/value - *There have been a few studies applying actor network theory in analysing the formulation of policy, especially in universal service. The paper wants to close this gap.*

Keywords *Stakeholders, actor-network theory, universal service, telecommunications, Vietnam*

Paper type *Research paper/case study*

1. Introduction

Since signing the Bilateral Trade Agreement with the United States in 2002 and joining in the WTO in 2005, Vietnam has radically changed in the provision of universal service. Vietnam eliminated the cross-subsidy regime that was mandated to VNPT, the incumbent operator to deliver universal service. Subsequently, Vietnam in 2005 established Vietnam public telecommunication service Fund (VTF), an entity belonging to the Ministry of Information and Communications Vietnam (MIC), to collect financial contribution of telecom providers as well as subsidise providing universal service. Since 2005, Vietnam has introduced two programs on the provision of universal service. The first program was launched in 2006, the so called 'Program on the provision of public telecommunications service till 2010" (the Program 74). The Program 74 was implemented from 2005 - 2010. In 2011, the second program on provision of universal services was already approved by the Prime Minister and would have been deployed in a five-year-interval, from 2011 to 2015 (Decision 1643, 2011). However, this program was postponed and reformulated. On July 24th, 2015, the Prime Minister issued another second program, namely 'the program on the provision of public telecommunications services until 2020' (the Program 1168). The program 1168 has been divided into five-

part plans and focused much on subsidising infrastructure roll-out. It is implemented till 2020.

After some years of deploying the two programs, Vietnam achieved remarkably successes. However, it has also revealed many issues in formulating and implementing the two programs on provision of universal service (the program 74 and 1168), such as:

- The top-down approach, not based on a market-oriented mechanism, adopted by Vietnam led to the gap between the services subsidised and the rural users' demand(Thai, Falch, & Williams, 2016);
- The interactions between the central government and provincial governments as well as provincial governments and telecom providers were not streamlined and relatively loose(Thai, Falch, & Williams, 2015);
- The lack of the participation of civil society and private sector (Thai, Falch, & Williams, 2016);
- Both programs focus much on the supply side and neglect the demand side, such as: the improvement of the knowledge and ICT skills of users or the development of applications in education, agriculture, and health information in local languages (both two programs do not have any budget for initiatives regarding training, education, or support for universities/research institutes researching on rural users' demand, services, etc.) (Thai, Falch, & Salakpi, 2016).

In Vietnam, there was another universal service project tagged 'Improving ability of using computers and public internet access in Vietnam' (the BMGF-VN project) initiated by the Bill and Melinda Gates Foundation (BMGF), a Non-Governmental Organization. The BMGF-VN is mostly funded by BMGF to the tune of 33.6 million USD. The rest of budget came from MIC, VNPT, Viettel, and provincial governments (16.9 million USD). The main objective was to improve competence and the way of providing information of Public Libraries (PLs) and Cultural Post Offices (CPOs) at 40/63 provinces to assist rural users, the poor and vulnerable population to access information. Distinguished from the two programs funded by the central government, the BMGF-VN project not only focused on providing PLs and CPOs facilities (e.g. computers, printers, cameras, and software), but also focused on: training activities; communicating and advertising the program via public media and events to improve the knowledge and skill of internet users as well as attract rural inhabitants to come to PLs and CPOs; and annually carrying out an impact assessment of the training, communicating activities, and rural users' ICT needs to adjust the program to fit their needs. After six years (2011-2017), the BMGF-VN project distributed 12,670 desktop computers, 1,900 printers, 1,900 IP-cameras, and other equipment to 400 provincial/district libraries, 500 commune libraries, and 1,000 CPOs. They also held up 5,811 events for 288,500 participants, produced 1,811 bulletins/news via public medias, and provided training courses for 14,718 participants (librarians at provincial/district/commune libraries, and staff at CPOs). Especially, the BMGF-VN project mobilized the participation of various non-government actors (civil society and private actors) in deploying the program. The BMGF-VN project made a big contribution to the social and economic development at provinces/locales it funded. It is illustrated via the amount of time using computer and connecting to the internet, the number of participants accessing PLs and CPOs, and the desire of staff of PLs and CPOs to run their own activities (by their own budget) to attract more users. The significant success of the BMGF-VN project lead to this research. In this paper, we attempt to seek the answer of the questions:

1. *What motivations and relationships between actors in formulating and implementing the BMGF-VN project?*
2. *What lessons should be recommended to Vietnam to solve these issues as well as enhance the provision of universal service?*

To answer the questions, the paper applies actor network theory to analyse the project 'Improving ability of using computers and public internet access in Vietnam' (the BMGF-VN project) in the context of boosting the development of ICT in countryside in Vietnam. By analysing the BMGF-VN project under actor-network theory, the paper tries to show the motivations and relationships between actors who formulated and implemented this project. In other words, actor network theory helps to investigate how actors (both human and non-human actors) aligned their interest into a social and technological arrangement or artefact. Based on these findings from the analysis, recommendations will be provided for Vietnam in terms of who should be involved in the formulation and implementation of universal service policy.

The concept of universal service is distinct across countries. It is likely that each country creates their own definition in line with its social, economic, and technological development. According to the ITU, universal service has three fundamental characteristics: availability, accessibility, and affordability. The main target of universal service is to ensure individual accessibility to basic telecommunications services regardless of geography, gender, ethnicity, disabilities or other factors. In this paper, the term of universal service used is based on the Vietnamese government's view. Universal service in Vietnam (or the so-called public telecommunications service) included universal and mandatory telecommunications service. In which, the universal telecommunications service was standard telephone service and standard Internet access service; the mandatory telecommunications service was emergency calls.

The paper is structured as follows: Section 2 presents the theoretical framework and research method, section 3 analyses the BMGF-VN project, section 4 are discussion and preliminary conclusions.

2. Theoretical framework and research method

2.1 Theoretical framework

Actor-Network Theory (ANT) was developed by Michel Callon and Bruno Latour (Walsham, 1997). It provides a framework to explain the process of technology adoption (McBride, 2003). Walsham (1997) points out that ANT examines the motivations and actions of actors within the social - technical network. Actors here are not just humans (people or organizations) but also non-humans (software, computer and communications hardware, and infrastructure standards) (Walsham, 1997). Actor-network can be technical or social arrangements where actors' interests are translated into a network (Monteiro & Hanseth, 1996). According to Walsham (1997) 'successful networks of aligned interests are created through the enrolment of a sufficient body of allies, and the translation of their interests so that they are willing to participate in particular ways of thinking and acting which maintain the network'.

In ANT, 'translation' and 'inscription' are of key concepts for understanding process of aligning interests of actors to form an actor network Walsham (1997). Translation implies that actors align interests of other actors with their own into a network. An inscription is the result of the translation of one's interest into material form (Callon, 1991). In general, any component of the heterogeneous network of skills, practices, artefacts, institutional

arrangements, texts and contracts establishing a social order may be the material for inscriptions (Monteiro & Hanseth, 1996).

ANT has been widely used to analyse the process of technology implementation. However, a few researchers have analysed the formulation and implementation of ICT policies under an ANT lens (Gao, 2005; Shin, 2010; Shin & Lee, 2011). To analyse the formulation and implementation of strategies for the development of telecommunication market in China, Gao (2005) designs a research framework (Figure 1). In this framework, he considers the telecommunication market as a non-human actor and defines the public and society, the state, and the operators as the groups of human-actors representing the social interests in the telecommunication area. His analysis shows that how actors translated and inscribed their interests into the strategy formulation for the development of telecommunication market in China. He also posits that it is important to take contextual analysis into account to capture the strength and flexibility of actors' interests and their power to influence an inscription.

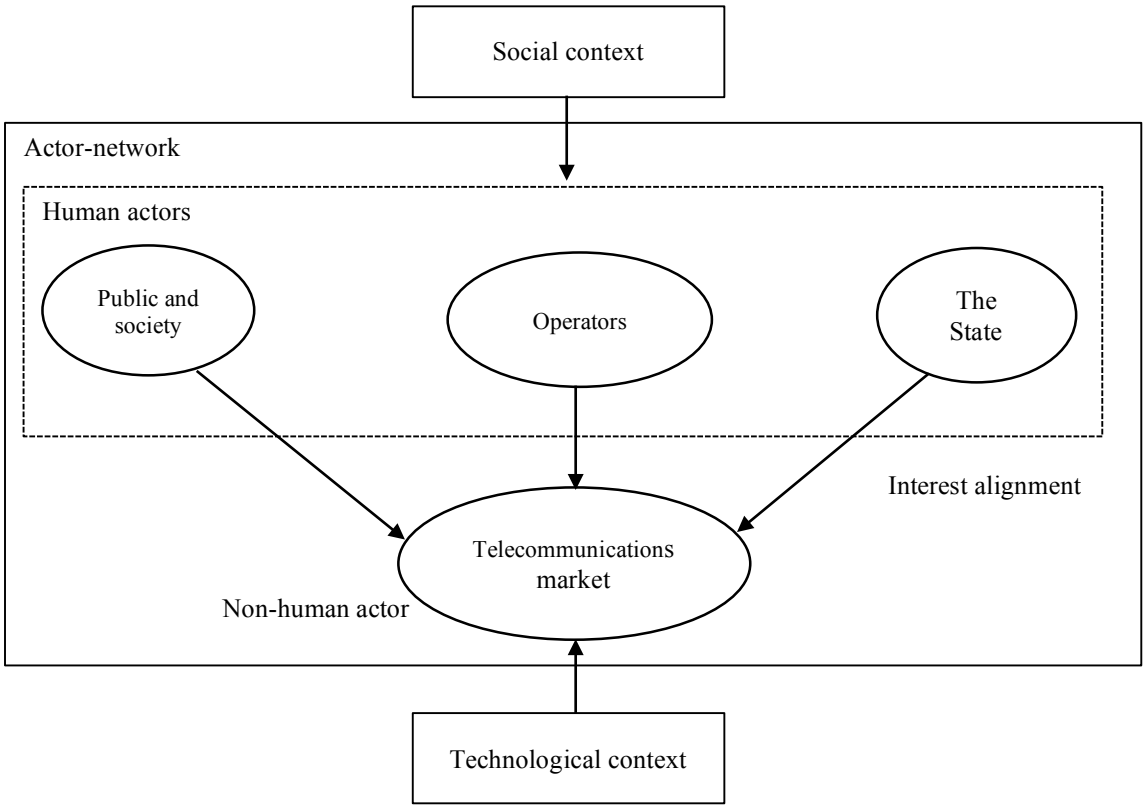

Figure 1: Framework of actor network analysis (Gao, 2005)

Shin & Lee (2011) base on the ANT framework of (Gao, 2005) to analyse the Korea's strategy for the development of the ubiquitous city (u-city). The findings show that the Korean government should consider not only non-human actors or technological factors, but also human actors or social/cultural issues in the process of constructing social-practice infrastructure. In other words, they argue that the clear understanding of how networked applications and scientific inquiry have been transformed by pervasive

infrastructure is also indispensable. Shin (2010) employs ANT to analyse policy-making process of the convergence in terms of politics and regulation, and examines how actors' interests are aligned and coordinated in the policymaking process of convergence in Korea. He shows that the actor-network around convergence is not effectively stabilized, as the politics of convergence is complex and marked by paradoxical features. Hence, he suggests the Korean government should create a friendly regulatory environment to the growth, development, and collaboration of actors across all spectrums, including technology, infrastructure, and content.

2.2 Research method and data collection

The paper applies the actor network analysis framework of Gao (2005) to look at the BMGF-VN to investigate motivations and relationships between human actors and non-human actors in formulation and implementation the BMGF-VN project in the context of boosting the development of ICT in countryside in Vietnam. Based on these findings from the analysis, recommendations will be provided for Vietnam in terms of who should be involved in the formulation and implementation of universal service policy.

According to Walsham (1997), non-human actors are technological artefacts. Gao (2005) argues that an 'artefact' is 'a fact created by human beings and usually refers to a technological design in literature' and he considers telecommunication markets as the non-human actor. In this paper, we consider universal service as a non-human actor. Human actors are people or organizations who stand in or speak for particular interests (Walsham, 1997). In his research, Gao (2005) defines the public, the state, and the operators are human actors representing the interests of the telecommunication market in China. In our paper, we define public and society, the state, Bill and Melinda Gates Foundation, telecom providers, VNPost (Vietnam post company) are human actors. And eventually, an actor network is a network of various interests of actors translated and inscribed into them. In this paper, the actor network is the BMGF-VN project (Figure 2).

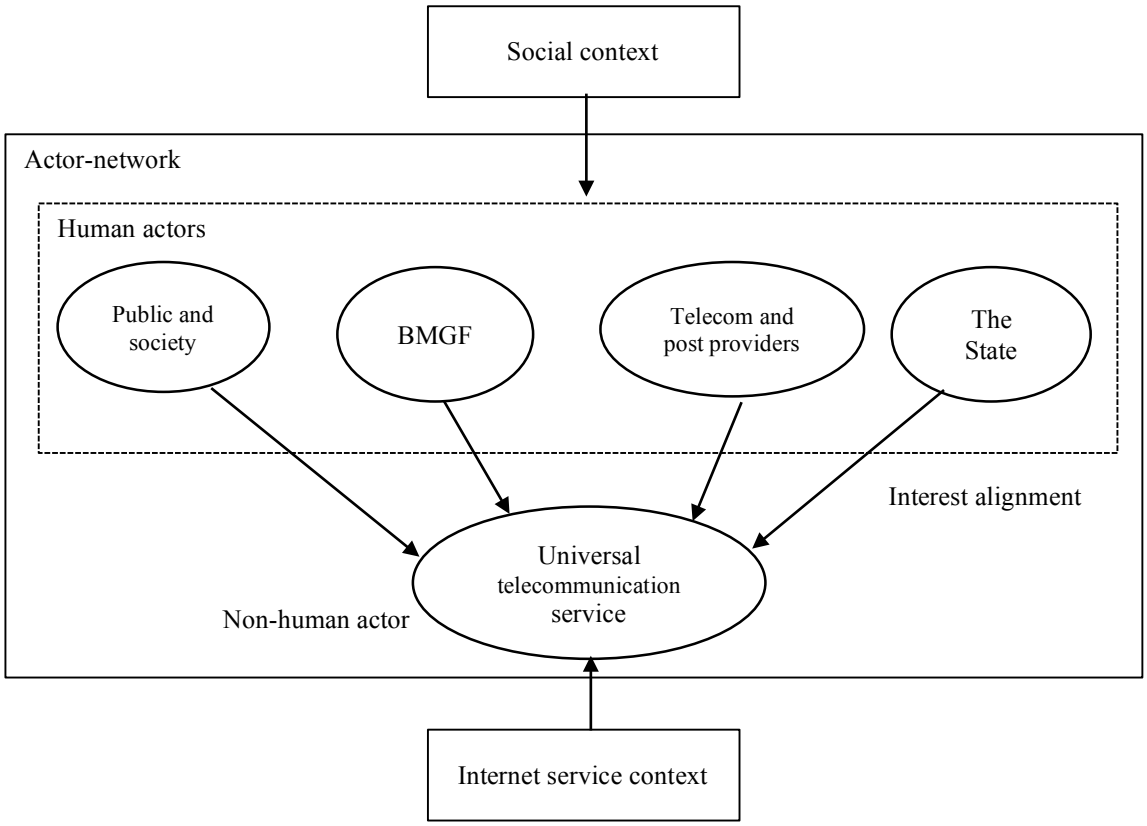

Figure 2: Actor network analysis in universal service in Vietnam

This is a qualitative research. The study is based on the case study conducted in Vietnam. The qualitative method is recruited to analyse some documents, such as telecommunication regulations, the Telecommunications Law, reports from the Management Unit of the BMGF-VN, data on webpages, and some from ITU and the World Bank. Documentary analysis is appropriate for the examination of public and private documents, and "enables a researcher to obtain the language and words of participants at a convenient time" (Creswell, 2009). To supplement the analysis, a structure interview using ANT was performed. The respondents were Vietnam government officers (MIC and Department of Information and Communications-DIC), the Director of Management Unit of the BMGF-VN project, members of social organizations, staff working on public libraries and public telecom centres. The data was transcribed and analyses used narrative analysis.

3. Analysis

3.1 The interests of Actors

Furthering the development of ICT in general and enhancing the provision of universal service in rural areas in particular is one of critical missions of the Vietnam government. Within 04 months, since September of 2010 to January of 2011, the Vietnamese introduced two key projects in terms of development od ICT. In 2010, the Prime Minister issued the Project 'Fastening Vietnam to become an advanced nation in ICT' (Decision no 1755/QD-TTg), and in 2011 he issued another project regarding rural areas 'Boosting the development of ICT in countryside in Vietnam' (Decision no 119/QD-TTg).

Distinguished form universal service programs which rooted from such kind of these projects and delivered universal service to rural users, this project (issued by Decision 119) directed policymakers/regulators (MIC and Ministry of Agriculture), provincial governments, and state own enterprises (telecom providers, VNPost) to build up programs to deploy this project. The main objectives of this project were enhancing ICT infrastructure build-out in countryside to promote the development of economy, reduce the poverty, and improve knowledge of rural dwellers. To fulfil these objectives, the central government presented 6 groups of tasks, such as: enhance the provision of universal service; roll out broadband network to communes; improve the efficiency of the culture post offices and pilot community information centres; build up a special television channel on countryside; develop a model for delivering public administration services via internet; improve ability of computer usage and public internet access. They also called for mobilizing other resources (outside state budget) to build out ICT infrastructure.

Meanwhile, according to a survey on rural internet access and usage in Vietnam rural areas conducted by Long (2010, p.66-69) showed that 67% rural people used internet several time or frequently, almost all of them expected to use internet at least once per week. However, among persons who ever used the Internet, the percentage of using the Internet at public centres was very high (at community centres: 34.5%; at office: 32.8%; and at Internet café: 27.6%). One of the reasons that lead to the high percentage of the Internet use at community centres was that at community centre, the price of Internet access has been reduced compared to other types, then, rural dweller preferred to go there to use the Internet service. Contrary to this data, 91% of people did not have internet at home, only around 13% people had PC. In this survey data, it also revealed the applications that rural people used the most as they were online, such as entertainments and news were 65% and 71%, respectively; chatting and email were around 50%; and health, education, and agriculture were 41%, 33%, and 22% respectively. Apparently, we can see that rural dwellers or public and society in rural areas had high demand for using the internet. They needed connection to the internet for their entertainment, chatting, and searching information for education, heath, and farming. However, they did not have internet and PC at home. They usually accessed to the internet at public internet centres (due to the affordability). These interests were also appropriate to those of the state as they wanted to promote the development of economy and society, reduce the poverty, facilitate the application of ICT.

In 2007, Bill and Melinda Gates Foundation (BMGF)[1] worked with Ministry of Culture, Sports, and Tourism (MCST) to find out the library system in Vietnam and want to provide a grant for improvement of ability of using computers at public libraries in Vietnam[2]. However, according to the Director of Management Unit of BMGF-VN project 'Because MCST did not meet BMGF's requirements in terms of financial ability and the sustainability of the project, they looked for another partner'. And BMGF were instructed to work with MIC and Vietnam Public telecommunication service Funs (VTF) who could satisfy their requirement. The Director said that 'As working with BMGF, I propose them to subsidise for the CPOs. Because the CPOs comply with their conditions and moreover VTF could be their partner to deploy the pilot project[3]'. The CPO network

[1] BMGF is a non-government organization set up by the billionaire Bill Gate and his wife.
[2] MCST governs whole the libraries network in Vietnam.
[3] Before being a director of the Management Unit of the BMGF-VN project, he was a vice director of VTF. VTF is an entity belonging to MIC. Its main function is to subsidise the provision of universal service.

has function like libraries delivering newspaper, books, and internet connection. Nevertheless, it does not have much books as libraries, and belonged to VNPT (now VNPost) [4], a state-owned telecom provider governed by MIC. This grant was fit to the BMGF's goal that is transforming public libraries as community information centres via access to the internet as well as training courses on how to make full use of the internet and computer[5]. This grant was part of the Global Libraries program.

The BMGF's first grant was around 2.15 million USD[6] to run a pilot project within 18 months (later extended more six months). The pilot project aimed at equipping PCs and delivering training courses to staff of 99 CPOs and PLs at 3 provinces in Vietnam. The pilot project also coordinated with the PLs and CPOs to organize events for local dwellers about benefit of the internet. The result of this pilot project would be a critical condition to decision whether to expand this pilot project or not. After 18 months, this pilot project achieved successful and was awarded Best International Award for the "Best Rural Administration Initiative" at the E-world Award Ceremony 2011[7].

Due to the success of the pilot project, BMGF expanded this project to be more 5 years, 2011-2016 (later extended 1 year to 2017) with another grant of 33.6 million USD. The rest of budget (16.9 million USD) came from MIC, VNPT, Viettel, and provincial governments. The expanded project (the BMGF-VN project) would be deployed at 40/63 provinces in whole nation. Like the pilot project, the BMGF-VN project would provide PLs and CPOs facilities (PCs, printers, and cameras). Besides, as a key condition to receive the grant from BMGF, MIC had to implement four-part programs, such as: training; advertisement; build up a website to provide necessary information to people; and independent project analysis (IPA). They were key parts of this project as well as BMGF's requirements. MIC also had to establish a Project Management Unit to be its representative to deploy activities of the BMGF-VN project.

To deploy the project and comply with commitments to BMGF, MIC had to work with provincial governments in terms of budget that would be contributed into the project. More specifically, these provinces, where the project would implement (40 provinces), would have to pay salary for staff, the electronic, connection to the internet, facilities (tables and chairs) at provincial/district PLs[8]. VNPost would also have to pay the same items as provincial governments, however they paid for CPOs. MIC had to work with telecom providers to reduce the internet subscription fee to 30% or 50% for PLs and CPOs. Basically, to participate in the BMGF-VN project, all actors (MIC, provincial governments, telecom providers, and VNPost) had to make financial contribution into this project[9]. However, it can be said that they also got much benefit from the BMGF-VN project when it would be implemented. PLs and CPOs would receive facilities (PCs and printers) for their libraries, they would be also provided training courses on using computer and the internet. Telecom providers (VNPT and Viettel) would have opportunity to preoccupy the market.

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[4] VNPT, till 2007, set up 8,021 CPOs in entire country (Tuan, World Bank, 2011). This network later has been merged into VNPost.

[5] http://www.gatesfoundation.org/What-We-Do/Global-Development/Global-Libraries#OurStrategy accessed on June 18, 2017.

[6] The total budget was appropriately 2.2 million USD, in which BMGF granted 2.15 million USD, the rest was contributed by VTF.

[7] http://www.gatesfoundation.org/Media-Center/Press-Releases/2011/11/Vietnams-Public-Libraries-Offer-Improved-Access-to-Information-and-Technology, accessed on June 16, 2017

[8] Provincial governments are responsible for public libraries at their locale. CPOs belong to VNPost.

[9] MIC had to contribute 335,000 USD

The last actors participated in the BMGF-VN project were telecom providers (VNPT and Viettel). They had to reduce 50% (VNPT) and 70% (Viettel) of subscription fee of connection to the internet for PLs and CPOs who got grant (PCs and printers) from the BMGF-VN. However, this reduction was fit to their business strategy. VNPT is an incumbent in Vietnam. Before reforming the telecommunication market, they were mandated to provide universal service under the cross-subsidy regime. VNPT till 2007 established a network of 18,941 places (including post offices and CPOs) in entire country (Tuan, 2011). Hence, reducing the internet subscription fee for CPOs would make this network more attractive to rural users. Meanwhile, Viettel entered into the telecommunication market in 2000 by providing the VoIP service. However, today they become the biggest operator in Vietnam in terms of both revenue and market share. By the business strategy 'countryside besieges the city', they at the first days focused to develop the market at rural areas. This strategy was very successful and gave them the number one position as now[10]. Hence, their strategy was also appropriate to the objectives of the BMGF-VN project.

4. Discussion and preliminary conclusions

Despite of a small project (compared with other universal service programs funded by the government) mainly funded by a NGO, the BMGF-VN project made a big contribution to the social and economic development at these provinces/locales. Distinguished from the two programs funded by the central government (the Program 74 and 1168), the BMGF-VN project not just focused on the supply side, such as providing PLs and CPOs facilities (e.g. computers, printers, cameras, and software), but also focused much on the demand side, such as: training courses; advertising the program via public media and holding events to improve the knowledge and skill of internet users as well as attract rural inhabitants to come to PLs and CPOs; and annually carrying out an independent project analysis (IPA) to evaluate the influence of the training, advertisement activities, and rural users' ICT needs in order to adjust the program to fit their needs. Especially, the BMGF-VN project mobilized the participation of various non-government actors (Learning Promotion Association or Youth/Women Associations) in deploying the project. These associations encouraged and persuaded rural users to participate in advertisement events and training courses. According to a vice director of DIC in an interview said that 'members of Learning Promotion Associations[11] participate in training courses hold by the BMGF-VN project, and after that they organize other training courses or introduce for rural users about the locations of PLs and CPOs close to them as well as provide rural users knowledge of computer and the internet'. The vice director posited that the role of these associations is critical and make a significant contribution into the spread out of the project. He said that 'It is a creative way to get as much as involvement of social associations into advertising and promoting the BMGF-VN project'. Besides, the training courses were auctioned and usually updated to fit to rural users and staff of PLs and CPOs. It is also an indispensable factor leading the success of the BMGF-VN project.

In this project, the role of telecom providers (VNPT and Viettel) does not play much. They just reduced the internet subscription fee and set up connection to PLs and CPOs (if these places had not accessed to the internet).

[10] http://cafef.vn/ong-nguyen-manh-hung-va-nhung-bai-hoc-kinh-doanh-cua-viettel-20140224230745923O.chn accessed on June 15, 2017

[11] They are civil associations having function of gathering and promoting people learning. http://www.hoikhuyenhoc.vn/modules.php?name=News&op=viewst&sid=2280

After six years (2011-2017), the BMGF-VN project distributed 12,670 desktop computers, 1,900 printers, 1,900 IP-cameras, and other equipment to 400 provincial/district libraries, 500 commune libraries, and 1,000 CPOs. They also held up 5,811 events for 288,500 participants, produced 1,811 bulletins/news via public medias, and provided training courses for 14,718 participants (librarians at provincial/district/commune libraries, and staff at CPOs). It is illustrated via the amount of time using computer and connecting to the internet, the number of participants accessing PLs and CPOs, and the desire of staff of PLs and CPOs to run their own activities (by their own budget) to attract more users.

Based on the positive result of the BMGF-VN project and findings of the analysis, we can see that the involvement of non-government actors in formulating and implementing the project, the focus not only on the supply side but also demand side are very important.

Deriving inspiration from this project, such bottom-up approach could be adopted by the Vietnamese government to enable the demand of broadband adoption. This implies that newer actors with newer competence should be encouraged to be partner in the adoption of broadband in Vietnam. In this way, the existing supply initiatives will match up with the demand needed for the broadband infrastructure.

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Universal Service Policy in Vietnam: A Supply – Demand Perspective

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Abstract

Universal service provision is a key to bridge the digital divide. This paper provides an empirical examination of the Vietnamese universal policy introduced in 2015 for implementation up to 2020. Using the framework of King et al. (1994) the paper analyses the universal services policy in Vietnam as well as the policies of broadband development in South Korea and Japan in order to clarify the types of universal service initiatives made in these countries. Furthermore, the paper compares the universal service policy in Vietnam with the broadband development policy in South Korea and in Japan in order to evaluate whether the Vietnamese universal policy is efficient. The paper concludes with a discussion of how an effective universal policy can be designed.

Keywords: Universal services, broadband, policy, supply, demand.

1 Introduction

Information and communication technologies (ICT) in general and broadband technology in particular become still more important for the social and economic development at the national level. According to a World Bank study, every 10 percent increase in broadband penetration has led to an

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increase of 0.24 to 1.5 percent in economic growth (Kelly & Rossotto, 2012). Nevertheless in many countries searching for remedies, the questions of how to transform fully the advantage of ICT into the growth of society and economy, and how to enhance the build out of broadband still remain. Previous research have agreed that the role of government policies is critical when it comes to stimulate penetration of broadband (Falch, 2007; Frieden, 2005; Hammond IV, 2005; Lee & Chan-Olmsted, 2004; Lee et al., 2003; Picot & Wernick, 2007; Samarajiva, 2000). However, no one-size-fits-all policy has been developed. Each country has pursued their own strategy taking country-specify social and economic conditions into account.

From the supply-demand angle, this paper will look at the universal service policy in Vietnam and the policy of broadband development in South Korea and Japan in order to identify the types of initiatives pursued in these countries. Furthermore, the paper compares these three countries in order to evaluate the Vietnamese policy and to identify additional possible policy measures.

Based on this, the paper will attempt to answer the following question:

Which types of policy should Vietnam introduce?

To answer this question, the paper applies the framework of King et al. (1994) in order to analyze the universal service policy being implemented in Vietnam as well as the broadband policies deployed in South Korea and Japan. The paper applies an demand-pull and supply-push model of government intervention for IT diffusion.

The definition of universal access and service (UAS) is very distinct from country to country. It is likely that each country has created a definition that is in line with its social, economic, and technological development. According to ITU, there are three fundamental characteristics of UAS: availability, accessibility, and affordability. The main target of UAS is to ensure that basic telecommunications services are accessible to individuals regardless of geography, gender, ethnicity, disabilities, or other factors. In this study, the term of UAS in Vietnam is understood as the provision of public telecommunication services, which include universal services as well as mandatory telecommunication services. Universal services are defined as voice telephony service, fixed broadband Internet access service, and terrestrial mobile communication service. The mandatory services include emergency calls[1]. Subsidies are provided for the provision of fixed line and terrestrial mobile communication services to low-income households.

[1]Decision no 1168 issued on 24th July, 2015 by the Prime Minister approving the Program on provision of public telecommunications services till 2020.

Subsidies are also provided for fixed broadband Internet access to communes, hospitals, and schools over the whole country.

The paper uses qualitative methods to analyze secondary documents collected from the Vietnamese Ministry of Information and Communications (MIC) and the Vietnam Public Utility Telecommunication Service Fund (VTF), and some international organizations. Then the authors make a comparison to evaluate the universal services policy in Vietnam.

The paper is structured as follows: Section 2 presents the theoretical framework and research methods, Section 3 highlights the background for universal service provision in Vietnam; Section 4 shows policies promo ting universal services/broadband development in Vietnam, South Korea, and Japan; Section 5 analyses the results; and finally, Section 6 provides conclusions and some recommendations.

2 Theoretical Framework and Research Method

In their study, King et al. (1994) argued that information technology (IT) has been increasingly used in both developed and developing countries. To enhance further the application of IT, governments tend to facilitate the diffusion of IT. However, due to the absence of research on institutional factors, some of the appropriate national policies are uncertain and ambiguous (King et al., 1994).

Based on the perspective of the supply-push and demand-pull model, King et al. (1994) posit that an institution is any standing social entity and might exert influence and regulation over other social entities via supply-push and demand-pull force. In which the supply-push force comes from the production of the innovative product or process itself and the demand-pull force arises from the willingness of potential users to use the innovation. By combining perspective of supply and demand theory, and power of an institution (influence and regulation) they recommend six actions institutions can take in order to promote the diffusion of IT (Table 1):

1. knowledge building,
2. knowledge deployment,
3. subsidy,
4. mobilization,
5. standard setting, and
6. innovation directive.

Each type of these actions can address either the demand or the supply side.

Table 1 Dimensions of institutional intervention (King et al., 1994)

	Supply-Push	Demand-Pull
Influence	Knowledge building	Knowledge deployment
	Knowledge deployment	Subsidy
	Subsidy	Mobilization
	Innovation directive	
Regulation	Knowledge deployment	Subsidy
	Subsidy	Standards
	Standards	Innovation directive
	Innovation directive	

Knowledge building is undertaken to provide the scientific and technical knowledge base required to produce and exploit innovations, e.g., funding of universities and research;

Knowledge deployment is to stimulate the dissemination of new knowledge; *A subsidy* is support provided to innovators and users to defray the unavoidable costs or risks related to the innovation process and the diffusion of usage;

Mobilization basically means the encouragement of decentralized actors and organizations to think in a particular way with respect to an innovation, e.g., promotional and awareness programs or advertisement to support the use of innovations;

Standard setting is a form of regulation aimed at constraining options of decentralized actors and organizations in line with larger social or institutional objectives;

Innovation directive is a command to produce innovations, to use them, or to engage in some activity that will specifically facilitate production and/or use.

This paper is applying the framework with the supply and demand side in order to look at which actions Vietnam, South Korea, and Japan have taken as part of their ICT policy. Through a comparison of national policies, the paper evaluates the efficiency of the policy being implemented in Vietnam. Some lessons for Vietnam and developing countries in building up policies will be drawn.

The secondary data were mainly collected from the Vietnamese Ministry of Information and Communications (MIC) and the Vietnam Public Utility Telecommunication Service Fund (VTF). Some data were also gathered from reports of international organizations (ITU, the World Bank), nations and research findings of some papers.

The analysis of Vietnam focuses on two ICT policy programmes: In 2006, Vietnam introduced the 'Program on the provision of public telecommunications services until 2010'. This program was completed in 2010. Recently, the government just issued another program, the 'Program on the provision of public telecommunications services until 2020 (Decision 1168 dated on July 24, 2015)'.

3 Background in Universal Services in Vietnam

Vietnam has carried out policies on universal services since the 1990s. However, since joining the World Trade Organization in 2006, the Vietnamese government has considerably adapted the universal service policy to meet the WTO's requirements.

The first universal service program was implemented from 2005–2010 (namely the Program on the provision of public telecommunications services towards 2010). The total budget of this program was approximately 210 million euros funded by a share of the annual revenue of the incumbent providers. This program made some significant achievements, the penetration rate for fixed lines increased to 16 percent at the end of 2010 (more than 6 times the penetration in 2005) and the penetration of internet subscribers increased to 0.32 percent in 2010 compared to 0.018 percent in 2004 (Report 74, 2012)[2].

Nevertheless, some targets of the program were not reached. A mere 55% of communes throughout the country had a public internet access centre and only 40% of the households in unserved and underserved areas had a fixed-line (Report 74, 2012). The type of universal services provided was still modest. The majority of universal services were fixed voice and dial-up internet access or broadband internet access (Decision 43, 2006)[3]. The form of provision of universal services was completely implemented via 'order place' or 'plan assignment' imposed on incumbent operators, not by bidding or based on the market mechanism (Circular 05, 2006)[4].

[2]MIC's report on the implementation of the Program on provision of public-utility telecommunications services until 2010.

[3]Decision no 43 dated November 2nd, 2006 by MIC Issuing the list of public-utility telecommunications services.

[4]Circular no 05 issued on November 4th, 2006 by MIC Guiding to implement the Program on provision of public-utility telecommunications services until 2010.

In 2011, the second program on provision of universal services was already approved by the Prime Minister and would have been deployed in a five-year-interval, from 2011 to 2015 (Decision 1643, 2011)[5]. However, the second was postponed and reformulated. On July 24th, 2015 the Prime Minister issued an additional program: Program on the provision of public telecommunications services until 2020.

4 Policies Promoting Universal Services/Broadband Development

In this section, the paper will use the framework of King et al. (1994) to analyze initiatives implemented in Vietnam, South Korea, and Japan.

4.1 Vietnam

After some years to adapt and build up the new program, 'on July 24th, 2015 the Program on the provision of public telecommunications services until 2020' was issued (here in after called Program 1168), a total of the budget is around 440 million euros. The program 1168 has been divided into five-partplans: Broadband Connection Plan, Emergency Connection Plan, Public Connection Plan, Institutes Connection Plan, and Digital Broadcast Connection Plan. Table 2 specifies the plans that Vietnam is implementing.

4.1.1 On the supply side

In order to enable the availability of telecommunication infrastructure for the provision of universal services, Vietnam has issued a variety of subsidies, such as subsidies for the development of infrastructure, and subsidies for development and maintenance of public internet access centres.

Subsidies for development of infrastructure – the Broadband Connection Plan:

Recognized the shortcomings of the precede program (Program on provision of public-utility telecommunications services until 2010) in terms of insufficiently supporting facility-based service providers in infrastructure

[5]Decision no 1643 issued on September 21st 2011 by the Prime Minister approving the program of provision of universal services period 2011–2015.

Table 2 An overview of the program on the provision of public telecommunications services until 2020

	Broadband Connection Plan	Emergency Connection Plan	Public Connection Plan	Institutes Connection Plan	Digital Broadcast Connection Plan
Beneficiary	Facility based service Providers	Users	Users	Schools, hospitals, and Commune People's Committees	Poor households
Investor	Government and facility-based service Providers	Government	Government and Telecom Providers	Government	Government
Main objective	Mobile and Fixed Broadband Network	Access to emergency calls	Access	Access	Access to broadcasting

Source: Vietnamese Ministry of Information and Communication.

roll out[6], and departed from the point of view that "infrastructure development incorporated with efficient, technological management will facilitate the provision of universal services in future"[7] hence, in the Broadband Connection Plan, Vietnam is to primarily concentrate on funding of telecom providers enabling them to establish a broadband infrastructure in communes, where they not yet have broadband facilities. The main objective of the plan is to provide broadband access in 99 percent of the communes in the whole nation that have power. Dwellers may access to fixed broadband internet connectivity via public internet access centres. The subsidization accounts for a major share of the total budget of the Program 1168 (up to 70 percent of the budget, approximately 300 million euros). The subsidization will be auctioned to select telecom providers to build out

[6]Because interest of the loan was not really attractive to telecom providers and did not help them to offset the investment cost in unserved and underserved areas. Thus, not many facility based service providers wanted to loan, the amount of money disbursed solely reached 25% of planned budget (Report on the implementation of the Program on provision of public-utility telecommunications services until 2010, MIC 2012).

[7]Project of formulating the Program on provision of public-utility telecommunications services towards 2020, MIC.

infrastructure. Apparently, Vietnam in its agenda is to give a high priority in building up broadband networks, particularly in isolated and mountainous areas.

Subsidies for development and maintenance public internet access centres – the Public Connection Plan:

Besides, the government is also to deploy the Public Connection Plan. The main objective of this plan is to enable users living in underserved and unserved areas to access to broadband internet services at public internet access centres (PIACs). By this plan, telecom providers will not only be equipped with facilities (computer sets, printers/scans, and tables) to set up 500 new PIACs, but also get financing for maintenance of all of the PIACs in under served and unserved areas (consist of 500 new PIACs).

It can be said that this is a remarkable change of the government policy with regard to subsidizations compared with those of the previous program (Program on the provision of public-utility telecommunications services until 2010). Previously the government only provided facility-based operators with loans at preferential rates for roll out of networks and financed them to sustain public telecommunication services centres. However, nowadays they will provide finance to build up new infrastructure and equip the PIACs with digital devices in order to encourage users to access.

However, some kinds of actions like Knowledge building, Knowledge deployment, Innovative directive, and Standards have not been addressed yet.

4.1.2 On the demand side

In addition to providing subsidies to telecom providers, the government is also to grant subsidies to stimulate demand among the population.

Subsidies for demand – the Institutes Connection Plan:

The first measure is the Institutes Connection Plan. Identified institutes such as schools, hospitals, and commune people's committees that have a high demand for broadband internet in training, education, health, and provision of public administration services. However, many of them located in rural and remote areas have not yet access to broadband internet, due to lack of affordable infrastructure. The Institutes Connection Plan will fund these institutes to install broadband internet connectivity. Moreover, the usage of broadband internet services in these institutes will be subsidized with a special monthly

fee. Through the subsidization, the government hopes to enhance considerably demand for internet usage among the population.

In addition, the government will also subsidize poor households in their use of telephone or terrestrial mobile communication services via the Public Connection Plan. Having identified a decline in telephone subscriptions and a prevalence of mobile communication services, the government is to help poor households with payment of the monthly subscription fee to use a fixed line or a mobile communication service.

The government has not paid attention to introducing and improving end-users' IT knowledge or training them in the skills of using IT (Knowledge deployment and Mobilization) through deployment of any supply site or demand site initiatives.

4.2 South Korea

South Korea is one of the leading countries in terms of penetration of broadband in the world. The Korean government has played a critical role in implementing several national broadband development policies, liberalizing the telecommunication industry, and privatizing state-run companies (Lee & Chan-Olmsted, 2004), and particularly in carrying out facilities-to services-based competition on broadband policy implementation (Choi, 2011).

In 1993, South Korea formulated a set of national policies on broadband internet information infrastructure (the Korean Information Infrastructure Plan-KII and the Cyber Building Certification system) to foster broadband roll out.

4.2.1 On the supply side

On the supply side, the Korean government has introduced a wide range of initiatives to stimulate investments in broadband facilities (Lee et al., 2003). For instance the government has partially subsidized facility-based service carriers to construct broadband networks (*Subsidy*) (Choudrie et al., 2003) and it has supported research institutes and universities in order to undertake research and development in broadband technologies (*Knowledge building*) (Choudrie et al., 2003). In addition, the government has facilitated competition by granting licenses to telecommunications operators and implementing the hands-off policy to deregulate the registration procedure. They have also required builders of large apartment complexes to install information and communication networks for residents (Lee & Chan-Olmsted, 2004).

4.2.2 On the demand side

On the demand side, South Korea stimulated the awareness of people about the benefit of broadband access by forming the 'Ten million people internet education project' (*Mobilization*) (Choudrie et al., 2003; Lee et al., 2003). In line with this policy, IT literacy programmes for groups of housewives, elderly, military personnel, farmers, and low-income families have been initiated. Particularly, housewives were targeted as the main sector due to their great influence on household purchases. The government has funded private IT/Internet institutes for training housewives and allowing them to take internet courses at an affordable price (*Knowledge deployment*) (Choudrie et al., 2003). Furthermore, in order to promote the broadband access platform in apartments and new buildings, in 1997, the Korean government introduced the Cyber Building Certificate system (*Standards*) (Choudrie et al., 2003). Accordingly, the government issued certificates for buildings with high-speed telecommunications capacity and ranked buildings according to their capacity.

Consequently, the average annual growth rate of high-speed internet in South Korea, in the period 1999–2001, reached 30 percent (Lee & Chan-Olmsted, 2004). Moreover, in February 2001, 57.3 percent of the Korean internet home users had access to broadband connections, whereas the United States had the second highest penetration of only 11.1% (Lee et al., 2003).

4.3 Japan

With regard to measures of Japan that enhanced the penetration rate of broadband, we based our research on the National strategy for the information society (the e-Japan Strategy) to examine their policy implementation. The strategy was clarified by five specific programs (e-Japan Priority Policy Program)[8] (Takada, 2003). It can be said that the e-Japan Strategy was an ambitious program that Japan anticipated being the world's most advanced IT nation within five years (Takada, 2003).

[8]They are Formation of the World's Most Advanced Information and Telecommunications Networks; Promotion of education and development of human resources; Facilitation of Electronic Commerce; Digitization of the Administration and Utilization of IT in Other Public Areas; and Ensuring of security and reliability over advanced information and telecommunication networks.

4.3.1 On the supply side

The Japanese government issued various types of measures to foster the penetration rate of broadband infrastructure, such as:

(1) Providing low-interest loans, tax incentives, and loan guarantees to private telecommunication carriers for the construction of ultra-high speed network infrastructure in the program of Formation of the World's Most Advanced Information and Telecommunications Networks (*Subsidy*). (2) Installing PCs and providing broadband internet access to schools and 7,000 libraries, public halls across the nation in the program of 'Promotion of Education and Development of Human Resources' (*Subsidy*). (3) Promoting research and development in the program of Formation of the World's Most Advanced Information and Telecommunications Networks (*Knowledge building*). (4) Moreover, the government carried out a regulation reform in preventing and eliminating the anti-competitive behavior.

4.3.2 On the demand side

On the demand side, the government deployed almost three out of its five programs (the e-Japan Strategy) to stimulate demand for usage of ultra-high speed internet, such as the Facilitation of Electronic Commerce, the Digitization of the Administration and Utilization of IT in Other Public Areas (*Innovation directive*), and the Promotion of Education and Development of Human Resources (*Knowledge deployment*). In which, the Facilitation of Electronic Commerce boosted the commerce transactions online that led to the shaping the e-marketplace (B-to-B) and net action markets (C-to-C). The Digitization of the Administration and Utilization of IT in Other Public Areas promoted the electronic applications in administration field. It enabled administrative procedures in public areas to be conducted without any geographic or time constrains, thereby contributing to increased comfort and convenience for people. Moreover, the Promotion of Education and Development of Human Resources enhanced IT education and educational content in schools. Besides, in order to improve IT skill for its citizens (managers of SMEs, consumers, women, farmers, and fishers) Japan delivered IT skill training courses targeted to train around 6 million attendants.

By implementing the e-Japan Strategy, Japan although is not among top countries in terms of penetration, but they are leading in the penetration of FTTH and relating to bandwidths offered (Falch, 2007).

Table 3 encapsulates measures that Vietnam, South Korea, and Japan were, and are deploying.

Table 3 Summarizing measures applied by Vietnam, South Korea, and Japan

	Supply-Push		Demand-Pull	
Influence	Knowledge building	SK, JP	Knowledge deployment	SK, JP
	Knowledge deployment		Subsidy	VN
	Subsidy	SK, JP	Mobilization	SK
	Innovation directive			
Regulation	Knowledge deployment		Subsidy	
	Subsidy	SK, JP, VN	Standards	SK
	Standards		Innovation directive	JP
	Innovation directive			

Note: SK-South Korea, JP- Japan, VN-Vietnam.

5 Analysis

In this section, we will make a comparison between Vietnam's measures with those of South Korea and Japan in order to examine whether the Program 1168 is effective.

Basically, the Vietnamese government introduced the Program 1168 with efforts of balancing on promoting both supply side (subsidizing facility based service providers for roll out of broadband network and development of PIACs) and demand side (funding institutes to use broadband internet service and poor households to use telephone or mobile communication service). The main objective is to enable citizens and institutes to get benefit from the advantage of telecommunication services. In the Program 1168, the government is to focus on the development of infrastructure (subsidization up to 70% of total budget). However, these efforts only focus on the roll out of broadband network, while measures to increase knowledge or skills of citizens don't seem to have been considered to be effective policy tools.

Lessons from the prior program (the Program on provision of public-utility telecommunications services until 2010 mentioned in Section 3) shows that, if users have had information about this program and had recognized the benefits in terms of low charges and access to the ICT applications they could receive,

they would have used more telecommunications services and applied them in their business[9].

Lee et al. (2003) posits that efforts have focused on the supply side. It is assumed that services will be developed once the broadband infrastructure has been established. Hence it is not necessary to take initiatives to stimulate demand. Youtie et al. (2007) point out that reducing the cost of technology does not ensure rise in demand from low-income households. Similarly, Choudrie et al. (2003) conclude that citizens must be prepared to use the new technologies and services so that they can benefit from the enhanced capabilities.

Furthermore, the government should pursue a variety of policy measures for creating Internet demands as well as networks. This conclusion is also consistent with the study of Falch (2007) and Long (2010). As Falch (2007) states that it is important to stimulate the demand side via content development and increasing ICT skills. And Long (2010) indicates that universal service policy should spend money in promoting applications in education, agriculture, and health information by local language as well as funding of rural IT training. Apparently, policy makers need to emphasize not only on infrastructure development but also on demand stimulation and upgrading of users' ICT skills.

On the other hand, as demonstrated in the Table 3 we can see that the deployment of a wide range of strategies, each contributing to the boom in the penetration of broadband in South Korea, was very successful. It was in this case critical to include actions that stimulated demand, and not just focus on the supply site (Choudrie et al., 2003; Lee et al., 2003). Likewise, though not becoming the leading country on broadband penetration, Japan by applying complex programs is also successful with regard to achieving a high broadband penetration rate within a short time (Falch, 2007) or satisfy the highest service quality in the world (Takada, 2003). This point of view is as well similar to the study of Jordana et al. (2005). In their research, Jordana et al. (2005) posit that more complex initiatives have more intense impacts than simple ones on the regional internet usage rate. This argument is supported by the study of Damsgaard & Lyytinen (2001). Based on a study on the diffusion of electronic data interchange in Denmark, Finland and Hong Kong Damsgaard & Lyytinen (2001) point out that standard setting,

[9]An issue of this program was that the volume of telephone subscriptions that had been funded dropped considerably when the government stemmed subsidization. Because local users had not perceived the advantage of ICT (Report on the implementation of the Program on provision of public-utility telecommunications services until 2010, MIC 2012).

mobilization, knowledge building, and knowledge deployment are the most prominent measures that an institution may facilitate the diffusion of electronic data interchange.

Whilst the Program 1168 is somewhat simple, the Vietnamese government is only to carry out subsidization measures both for telecom providers and users. They do not pay attention to increasing the knowledge and ICT skills of users (knowledge deployment and mobilization strategies) or funding research institutes, enterprises to research developing the content (knowledge building strategy). South Korea and Japan may be very good examples for Vietnam and other developing countries to study. There are of course some other important factors such as culture, geography, demography, competition, and the PC Bang model contributing to the diffusion of broadband in South Korea (Lee et al., 2003). Although Japan also needs to enhance further the development of applications and content (Takada, 2003). Nevertheless, governments generally take the leading role influencing other players by their measures (Choudrie et al., 2003). They may foster ICT development by articulating from the top a broad vision of what ICT can do for a nation and their citizens (Frieden, 2005). Thus, initial measures to strengthen the penetration of broadband and promote usage have to come from governments who are responsible for formulating policies.

6 Conclusion

By applying the framework of King et al. (1994), the paper indicates that complex initiatives that stimulate the diffusion of ICT are very crucial, particularly the balance between the demand side and the supply side in formulating universal services policy.

Subsidization for facility-based service providers to build up broadband infrastructure is indispensable. It ensures that the carriers can afford to invest and maintain their business in unprofitable areas. Moreover, providing finance to develop public internet access centres is also to facilitate local citizens' accessibility to broadband internet services easier.

On the other hand, in order to stimulate demand for broadband internet, Vietnam is also to fund schools, hospitals, and commune people's committee to set up internet connectivity and use these services with low charges.

Nevertheless, the subsidies are not likely to be really effective if users do not know the benefits of ICT, especially dwellers living in unserved and underserved have lack of knowledge of ICT. The Vietnamese government should diversely deploy the Program 1168. That means along with support

for facility-based service providers, institutes, and users the government also needs to carry out other plans promoting demand, such as plans to improve the knowledge and ICT skills of users or develop applications in education, agriculture, and health information in local languages.

The research has also some limitations. Constrained number of countries compared in performance may not sufficiently stress the importance of applying complex actions or measures to increase knowledge and ICT skills. Future research should gather more other countries' policy initiatives to examine, particularly nations that have the same economic and social conditions.

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Biography

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