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Digital Economy Plan: Analysis and Recommendations

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Abstract

Many countries worldwide have placed emphasis on the vital engine like the digital technology, especially the broadband Internet that can give rise to the effective and sustainable modern economic growth. At the national level, the digital technology has not been adequately utilized in promoting the emergence of scientific, technological, and innovative breakthroughs. Therefore, the modern digital economy development plan has to holistically integrate the development of "digital ecosystem" in terms of networks, services, applications, and users through studying and placing importance on bringing supplies and stimulating demands in equilibrium, so that countries can effectively interrelate with the global community to stimulate the economic and social growth. The objective of this paper is to analyze the ecosystem of digital economy and propose a guideline to develop a digital economy plan to foster the socio-economic growth. This paper also gives recommendations to governments and policy makers for the supportive digital economy development plan.

Keywords: *Digital Economy, Plan, Analysis, Recommendation*

1. Introduction

The formulation of policies stimulating the digital economy significantly requires a wider perspective on the digital technology. From the fairly incomplete perspective that refers the broadband to merely the high-speed communication network providing users with the connection speed of at least 256 Kb / sec (or higher) to another perspective focusing on 'the digital ecosystem", made up of related aspects such as networks, services, and users, which requires the integration of several engines to be functional [1].

The digital ecosystem comprises the high-speed data network playing a role in linking users together and providing voice and data transfer services. This network can be developed for versatile utilization with easy-to-understand languages based on the user requirements

resulting in the related applications and content. This includes the users are provided with the required services, equipped with well-prepared skills, and have confidence in the security of the digital network and affordable-price communication devices. These stimulate additional investments in networks according to the market demand. When the network is growing, both in terms of the coverage area and the system capacity, it will facilitate the improvement of services that provide access to a large number of people, stimulate the widespread use, and result in the growth in the market of related applications, software, and hardware. These make users satisfy with the services provided, in terms of quality and decreasing price due to the rise in the number of users and the increasing complexity of technology usage stimulating the network to become grower until the complete "digital ecosystem" has arisen.

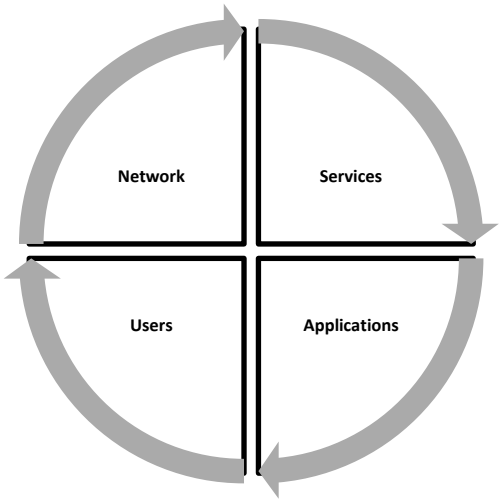

Fig.1: The digital ecosystem [2]

To take a holistic view of the digital economy as the digital ecosystem commonly encourages the public sector to impose the suitable policy framework for developing the economy and society in all aspects using ICTs as the major tool. Apart from promoting the expansion of networks – in other words to provide supplies – another important issues that the public sector should place emphasis on, such as to generate demands in terms of developing the ICT skills of personnel in the country, create the content and applications that meet the requirements in terms of using appropriate dialects, assure the safety of using the digital technology through applying the concrete approach to handle computer crimes, are all considered very important in that they can promote the government policies to be complete and furnished with all necessary components that make up the digital ecosystem [2].

As individual components of the digital ecosystem in various aspects are interrelated, the holistic approach to policy is regularly considered more successful. For example, the promotion of free investments and competition to expand either the fixed and mobile high-speed broadband networks commonly gives rise to more extensive network coverage, better

quality of services, and stimulate the utilization or applications requiring higher bandwidths. When various new applications have been launched, the variety will contribute to further expansion of networks to support the growing market. When the broadband network is used widely or has more users, it will results in the creation of miscellaneous content in response to different requirements. Once the content is satisfied, there will be a lot more page or content downloaders, sharers, and likers arisen resulting in the benefits gained through maximizing the chance of access to users from all corners of the world.

The study results of many countries show that the digital economy policy advocacy that results in great effectiveness commonly initiates from the expansion of broadband networks to provide more extensive coverage [3]. This generates various services that have favorable quality and affordable prices stimulating the widespread use and causing interesting content presented in dialects, development in related industries, ICT skills of users, the environment suitable for online applications (such as the enforcement and strong legal framework for computer crimes), and reasonable-price communication devices. These strengthen the society and community and contribute to the country's economic growth.

This paper is structured as follows. Sector II describes the formulation of digital economy development plan. Supportive policies on the digital economy development are proposed in detail in Section III and the conclusion.

2. The formulation of digital economy development plan

The study on the digital economy reveal different approaches to related development plans and policies among individual countries based on specific political, economic, social, and domestic industrial factors. The roles of the public sector can range from "active" which means to make direct intervention, "passive" or to rely on the private sector so as to achieve the digital economic growth, and "hybrid" which subjects to the cooperation between the public and private sectors [4]. Regarding the aforementioned roles, Finland, UK, and USA mainly take a passive role but are prone to take a hybrid role at some point, whereas France, Japan, South Korea, and Sweden prefer taking an active role to promote the digital economy policy and seek cooperation from the private sector as well.

It is clear that there is no fixed formula for the economic policy that suits each individual country, but various widespread procedures normally share some common characteristics. In order to fulfill the target, each procedure generally initiates from imposing the digital economy development plan that should made up of clear-stated targets, visions, strategies, operations frameworks, and related projects to fulfill the target. This includes the imposition of related policies and regulations in correspondence with operations frameworks.

1. The overall process

A successful process for developing the digital ecosystem in a country within a short period of time normally begins with drawing up a distinct development plan comprising visions, targets, strategies, and related projects to gain concrete target fulfillment. Then, the examination and evaluation should be carried out systematically to ensure that the development is in the correct direction before an appropriate adjustment is made accordingly.

Most of the world's top countries in broadband such as Denmark, Finland, South Korea, and the Netherlands all have already come up with digital economy development plans, for example, Japan has adopted the "eJpan strategy" development plan since 2001 which has gained continual improvement up to this time [5]. Similarly, South Korea has adopted several broadband development plans since 1980 which have been regularly revised in parallel with market changes [6].

Several governments from all corners of the world have shifted their role from being market dependence and sorely responsible for imposing market incentives, as previously successfully done in international mobile telecommunications. However, just only the competitive incentives may not be adequate for broadband Internet markets. This can be noticed from the study undertaken in USA where the government has promoted broadband telecommunications merely through the market force for almost ten years, up to 2009. During the same period, the position of USA in broadband penetration ranking fell from 2nd place in 1988 to 15th place in 2008, based on the OEDC ranking [7]. Accordingly, the government changed its attitude by officially imposed the national broadband development plan during 2010 instead [8].

Conversely, the South Korean government has played a pivotal role in promoting the rapid growth in broadband markets through practically formulating development plans for this particular activity along with adopting policies and creating a large number of related projects since the late 20th century up to the present day. This brought about the development encouraging South Korea to overcome the economic crisis, transform itself to a high-income country that can attract significantly heavy ICT investments, and finally become one of the world's leading countries in terms of digital technology [6].

2. Creating thriving markets

Though many broadband operators worldwide are private companies, several defects regarding this particular market still exist. For example, the majority of broadband infrastructures have been monopolized by a single typical operator without enabling competitors to gain a fair share of any benefits. This creates barriers to intense competition. Furthermore, the weaknesses in competitive incentives such as complex licensing processes, ineffective spectrum management, and limited access to financial capital pose threat to the trail toward a thriving market as well.

Many governments worldwide have launched solution strategies such as improving licensing processes, promoting the spectrum management approaches that are more open and facilitate new entry, permitting general operators to use the typical operators' networks at reasonable prices (such as interconnection regulation and local loop unbundling, etc.) [9]. Though each country adopts different competitive incentives; facility-based or service-based, they all have the same goal in bringing about a free, fair, and sustainable competitive market.

3. Creating accessible networks and services for everyone

To provide broadband services in remote and hard-to-access areas is considered a major obstacle to the expansion of extensive broadband network coverage, especially the fixed-broadband network that have higher costs than mobile networks. However, when a lot of the

public and private sectors began to provide diversified online services, equal access to these services at affordable qualities and prices should be provided for people from all walks of life. Generally, the target of digital economy development plans is composed of network coverage areas, number of users, and quality of services. For example, the target set up under the “Digital Agenda for Europe” framework requires that all Europeans are provided with extensive fundamental broadband Internet services by 2013, all populations are able to have access to broadband of at least 30 Mbps, and that at least half of all households can subscribe to the broadband of higher speeds than 100 Mbps by 2020 [10] [11].

In order to fulfill the similar goal, the South Korean government adopted financial incentives promoting operators to expand the networks to remote areas, whereas several countries in Europe such as France and Sweden would rather adopt the method of co-investment between the public and private sectors in combination with the regulations that govern operators to expand their networks to remote areas [3]. In Norway, the government gave financial supports to expand the networks to locations where broadband networks are still out of reach so that 99 percent of populations in the country could have fixed-broadband broadband penetration [12].

4. Putting forward demands

Many countries that experience success in broadband development regularly place emphasis on providing supplies (by expanding networks and services) concurrently with stimulating demands (utilization in business, public, and popular sectors). A great effort in demand stimulation is very necessary because the expansion of networks and services, especially to remote areas, requires huge capital. Therefore, in order to produce maximum benefits from such investments, local populations should be capable of using technology in producing economic and social impacts [13]. Accordingly, the public sector has to be directly responsible for building the awareness of advantages in digital technology and stimulating demands based on the three conceptual principles of the digital technology: accessible, affordable, and interesting as concluded in the Table I presented below.

Accessible	Affordable	Interesting
• Building up an ICT hub in the community • Connecting educational institutions to broadband networks • Making wireless broadband services available in public places, e.g. airports and business areas • Launching projects to thoroughly equip populations with ICT skills	• Adopting taxation measures or supplying target groups with ICT gadgets • Giving financial support regarding ICT gadgets to educational institutions • Giving correct and extensive information in accordance with service providers, prices, and related technologies	• Creating interesting content presented in local languages for a community • Providing information and public services through online media using applications, e-government, and other services like e-health, e-learning, etc. • Creating an appropriate legal framework to promote e-commerce and other applications • Enabling populations to see the advantages of digital technology • Encouraging the use of broadband in business sectors and communities

Table I: The three conceptual principles of the digital technology

3. Policies on the digital ecosystem development

The digital economy development plan has to be practically implemented through the following policies, regulations, and related projects according to the country's domestic markets. The plan can be divided into three stages as following:

Promoting stage: When the market is first opened and is still small, the public sector should give full support by giving importance to the intense adoption of both demand side and supply side policies to mainly aim at stimulating market growth. This can be done through reducing as many barriers to network expansion as possible, promoting various projects in relation to large-scale infrastructures, providing users with price support, and so on.

Overseeing stage: As the market has grown for a certain period, the public sector should reduce its intervention in markets. Instead, higher attention on regulating the policies that stimulate free, fair, and intense competition to allow the markets to grow continuously should be paid.

Universalizing stage: The policy considered important for the near saturated market is to provide populations with universal access to broadband services, especially people in remote areas, low-income people, and underprivileged people.

Components	Initial stage: Promoting	Growing stage: Overseeing	Near-saturated stage: Universalizing
Networks	• Create the environment that facilitates investments and access to markets. • Simplify working procedures and adopt strategies that boost R&D and network expansion. • Award certificates for operators who meet cyber security standards. • Manage spectrum effectively and adequately for the demands.	• Support the shared use of telecommunications infrastructures and promote local loop unbundling (permission for general operators to connect devices to the typical operator's telecommunications exchange). • Assign additional spectrum to support the increasing demands.	• Expand networks to remote areas under the cooperation between the public and private sectors.
Services	• Promote the use of broadband in schools, government sectors, communities, etc. • Set up standards and control network quality.	• Create a competitive environment of services, both in the same or different technology domains. • Adopt preventive strategies for barriers to service, application or content penetration.	• Impose universal service obligations on broadband.
Applications	• The state should study the overall market demands to promote precise utilization. • The public sector should lead in providing e-government and e-learning services attentively and extensively. • Promote the creation of digital content. • Develop domestic businesses in all aspects: content, software, and hardware.	• Promote private, reliable, and secured e-commerce transactions. • Adopt policies on intellectual property protection appropriately.	• Develop the e-commerce system to cover a wider service area. • Give financial support to the local area where the digital technology can be used to benefit the community effectively.
Users	• Help consume low-price ICT gadgets, especially for educational purposes. • Sharpen the skills to use digital technology in all aspects.	• Instill moral awareness of producing benefits from the data.	• Expand universal service program to remote areas. • Build up an ICT hub in the community. • Supply low-income households with ICT gadgets.

Table II: To compile policies, regulations, and related projects in relation to the growth in markets and the digital ecosystem.

The development of the digital ecosystem can be shown in Table II and describe as follows.

1. Initial stage: Promote – to accelerate expansion

Many countries that have quite low broadband penetration rates should place importance on implementing policies at this stage. They should focus on the major aim at accelerating market growth through adopting supply-side policies such as promoting investments in broadband networks along with demand-side policies such as raising the population's awareness of technological advantages, including adopting any policy to reduce barriers to broadband access in terms of skills, prices, and interests, etc.

Examples of supply-side policies

- Lower barriers to market access to promote the competition resulted from the increasing number of incumbents (in terms of operators and various technologies).
- Adopt appropriate policies on spectrum management to enable the growth in mobile network-related operations.
- Give full support to build the national backbone which requires a large amount capital. Generally, operators may be much concerned about the business profits gained from this kind of project. Therefore, the government may let all public sectors along with educational institutions, communities, and even business sectors be primary users to promote confidence among network investors, or the government may use other indirect methods such as giving support through finance measures, e.g. tax reduction, low interest rate loans, etc.

Examples of demand-side policies

- Give support to sharpen digital technological skills to raise awareness of advantages in technologies and related applications. Therefore, the government should extensively educate people in terms of computer and Internet skills.
- Distribute low-price ICT gadgets to the populations. Though the prices ICT gadgets available in many countries tend to be greatly lower, a lot of people in low-income countries and underprivileged people are still unable to afford the prices or possess these objects. Therefore, it is necessary that the public sector see the importance of supporting this matter.
- Place emphasis on adopting the e-government policy because the public expenditure is the driving force of economic growth which plays a major role in several countries. The implementation of e-government policy through providing information and services via online media will help stimulate the business and popular sector to see the importance of the online world. This will facilitate populations the quick and transparent access to public information and services as well as help enhance the efficiency in public operations.
- Creating online content and media is necessary for many developing countries where English is not an official language. Therefore, the majority of content available in the online world is meaningless for most populations in the countries.

The government should promote the creation of content and media presented in their own languages, the ones related and beneficial to the local areas in particular. In relation to this, the South Korea government has experienced a great success in stimulating the creation of content presented in Korean for the purposes of online music businesses, multimedia, e-government, e-learning, and so on. Furthermore, the most popular search engine in South Korean is not the world's biggest one like Google but Naver (Line producer) and Daum. Other than stimulating demands in the country, the policies promoting the creation of content also generates large income from exporting as well. For example, the gaming market in South Korea has experienced rapid growth since broadband services became popular and has eventually considered one of the country's major exported products.

Another important factor is the protection of intellectual properties which enables the content and media producers to gain full benefits from their intellectual properties, whereas the consumers are capable of using or improving the properties under the impartial practice framework to every stakeholder.

- Adopt policies that promote the business sector to use broadband and e-commerce. Generally, large private organizations in the private sector tend to use the digital technology at the maximum capacity. However, various small and medium enterprises (SMEs), which become the major proportion influencing economy of the country when combined together, may not be able to make the most use of the ICT technology. This possibly stems from the lack of knowledge, understanding or capital. Therefore, the government should implement the supporting policies by means of developing and distributing low-price applications (or free), conferring a privilege upon tax upon ICT investment funds, and conferring a privilege to ICT operators such as software developers.

  However, the growth in ICT and e-commerce can occur only if the government implements different approaches under appropriate legal framework such as enforcing laws and setting up regulators that can effectively enhance cyber security to booster confidence among the business and popular sectors in carrying out transactions in the online world.

2. Growing stage: Oversee – market rivalry

The objective of government intervention in telecommunications markets is to maintain the level of development under the market structure that allows liberal and fair competitions. Therefore, even in the countries where government intervention is unconcerned, the market competitive incentive is considered important, from the first up to the near-saturated stage.

<u>Example of policies in the growing stage</u>

- Promote a full-scale competition between newcomers and incumbents.
- Implement measures that support competition in terms of infrastructures and services.
- Introduce regulations to control any actions that create barriers to liberal competitions.

3. Near saturation stage: Universalize – extensive service coverage

When the market is near the saturation stage, the government should give importance on expanding network coverage to remote areas.

Examples of policies in the near saturation stage

- The populations from all walks of life should have equal rights to achieve broadband penetration.
- Give financial support to expand various forms of networks to remote or hard-to-access areas appropriately.
- Promote the use of digital technology among target users, especially the low-income populations who the government may need to throw its support behind household ICT gadgets so that they can gain advantages from such technology as well.

4. Conclusion

The way that mobile operators and ICT providers start providing commercial services, especially 3G/4G wireless and broadband networks, contributes to the huge rise in data transmission. The most important government policy playing a role in propelling countries toward an established digital economy concerns broadband infrastructures, especially better-quality mobile broadband infrastructures, which results in the increasing demands for spectrum to support the dramatically soaring number of telecommunications activities as well. The related sectors should arrive at some solutions to restrictions of spectrum so as to manage spectrum effectively through studying further domestic average spectrum demands so that the data can be used to draw up distinct plans, promoting the use of innovations appropriately, supporting the use of shared spectrum, including revising the law provisions that cause restrictions on spectrum allocation so as to make the best use of spectrum to yield public benefits. Moreover, the digital economy development plan has to be practically implemented through supportive policies, regulations, and related projects which are proposed in this paper.

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