The Transition of Economy from Analogue to Digital in the XXI Century by the case of the Republic of Korea

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Abstract

The article demonstrates the impact of digitalization on the political system and economy of the Republic of Korea based on the IT-revolution of the XXI century. Research methods used include comparative, system and logical data analysis, and the investigation of the digitalization trends. Data from Korean National Statistical Office and other official open sources are used for the determination of the main digitalization trends in the Korean economy. An analysis of specific phenomena arising in the economy and society as a whole is carried out under conditions of the digital economy. The evolution of the digitalization of hardware and software in the Republic of Korea is presented. The consequences of the transition of the economy from analogue to digital are revealed in such areas as the structure of the economy and business model, economic integration and liberalization, resource allocation and balanced development of regions, the role of government, and the intellectual property system.

Keywords: digital economy, Republic of Korea, liberalization, IT-revolution, high-tech content

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1. Introduction

The development of Information and Communications Technologies (ICT) in the XXI century is the main reason for significant changes not only in the functioning of economic systems, but also social and even political systems of different levels – for example, from the world economy to individual economic entities of internal countries. The transition to a digital economy is a key factor for the development of economic growth of not only national, but also global economies. Under ICT influence, there is a transition from the introduction of all kinds of digital technologies – including Artificial Intelligence (AI) and Internet of Things (IoT) – to the integrated construction of a digital ecosystem of countries.

IT-revolution in the XXI century is not just about advances in science and technology, but a change in the customs, norms and policies that govern a society. Particularly in the digital economy, diversity and openness, as well as liberalization and expansion of ideology, have been led by the private sector. Namely, the role of the private sector is growing in the digital economy.

The research is based on the example of the transition of the Republic of Korea to a digital economy. It is believed that the experience and characteristics of the digital economy of the Republic of Korea can be useful to countries developing their own national strategy of economic policy in the XXI century under modern conditions. The research carried out has the following research objectives: to reveal economic and social consequences of transformation from an analogue to a digital economy using the case of the Republic of Korea.

The paper includes a literature review in the sphere of digital economy, analysis of the main trends of the digitalization of the Korean economy digitalization on the basis of Korean National Statistical Office's data and other open-source data, and investigation of the consequences of the transition from an analogue economy to a digital economy.

2. Literature review

The transition from an analogue to digital economy was an urgent topic of investigation in the world from the end of XX – beginning of the XXI

century. Not only Korean scientists, but also foreign researchers have an interest in the analysis of the phenomena of Korean digital economy emergence, formation and development.

Digital economy emergence and growth in the Republic of Korea in XX century has been deeply investigated by Kim Junmo (2006). He analyzed the infrastructure of the digital economy in Korea between 1989 and 2000 on the basis of data from Bank of Korea and described a unique mechanism of the IT sector development in the Republic of Korea. Digital economy is considered in this paper as "continuum from the existing old economy" (Kim Junmo, 2006). Perspectives of Korean digital economy and high-tech development are revealed by Sung (2018). Kim and Min (2015) analyzed using e-commerce by local governments in Korea.

Digitalization of economic development in Korea aroused interest of foreign scientists with the emphasis on the possibility to use Korean experience in other countries. In particular, the case of the Republic of Korea "was selected for analysis due to high position of the country among others in terms of overall development of components of the digital economy" in the research paper by Russian scientists Ignatov (2019).

Innovativeness of Korean economy has been investigated in the works of Khalipov (2015), Gomboev (2015). In the investigation of Grishin and Timirgaleeva (2019, p. 627), leadership of the Republic of Korea in the sphere of digitalization is also noted. In the work of Barsegyan (2020), Korean experience in economy digitalization is represented as acceptable for application in Russia. Ivanova and Latyshov (2018) investigated the influence of globalization on the foreign trade policy of the Republic of Korea on the base of the KOF Index of Globalization, Digital Evolution Index, and Digital Adoption Index which show a high dynamic of Korean economic integration in the global economy.

The authors of the current article in their previous works analyzed processes of globalization and digitalization in different spheres (Danilchanka, Zhalezka, Siniauskaya and Yuakushenka, 2018; Oh Dok Hee, 2018). The main sources of the research base of the current article are compiled from materials of Korean scientists who studied the direction of the digital economy of the

Republic of Korea: Go Jongsuk (2015), Kim Kiwuan (2017), Kim Seongho (2017), Yun Seung Hee (2017).

The definition of the digital economy is given following the opinion of the Belarusian economists Kovalev and Golovenchik (2018). Not only scientists, but also politicians and practitioners understand that the digitalization of the economy in the XXI century has impact on other processes around the world. The digital economy became one of the most actively discussed topics in the XXI century.

The term "Digital Economy" became widespread after the ministerial conference of 40 developed countries held under the authority of the Organisation for Economic Co-operation and Development (OECD) in Cancun (Mexico) in 2016, which adopted "Ministerial Declaration on the Digital Economy: Innovation, Growth and Social Prosperity" (Organisation for Economic Co-operation and Development, 2016; Kovalev and Golovenchik, 2018, p. 22). The digital economy is an economic activity based on digital technologies. The issue is not about the traditional information economy, associated with the development and the use of information technologies (programs, database management systems, automated systems, etc.), but about electronic goods and services, the sale of virtual goods on the Internet, the use of electronic money and crypto currency, special Internet services, primarily social networks, the Internet of Things, Big Data, Cloud Data storage (Kovalev and Golovenchik, 2018, p. 23). The term "Analogue economy" is used in a different way. Analogue economy is the economic activity of society, as well as a set of relations that develop in the system of production, distribution, exchange and consumption.

The paradigm of the digital economy is characterized by freedom and autonomy, creative initiative and diversity, adventurism and openness, flexibility and variability, plurality and merging. This contradicts the analogous economic paradigm, which is characterized by such features as strong control, unification, equality, imitation, homogeneity, stability, closeness and shifting in only one direction. Digitalization of the economy has influence on all spheres of social-economic activity. In particular, the intellectual property rights system undergoes significant changes (Denton, 2011).

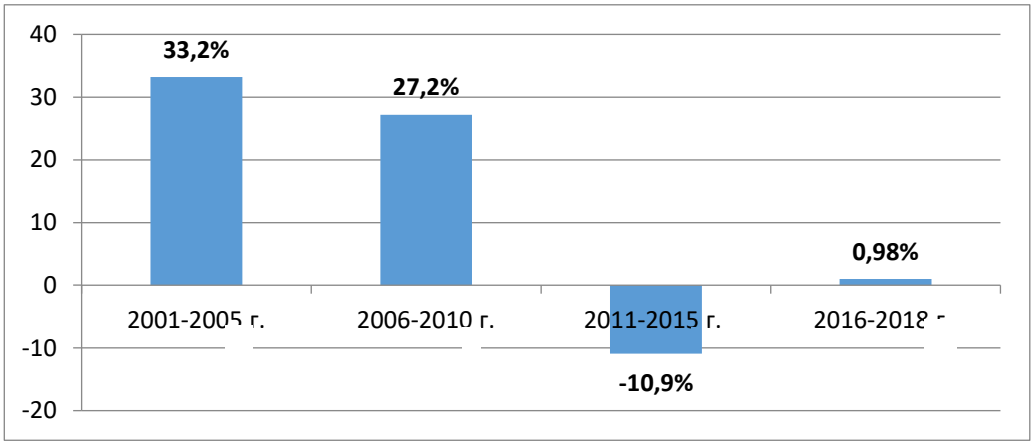
The efficiency of economic activity increases significantly when the economic paradigm shifts from analogue to digital. First of all, there have been strong changes in the models of behavior of business entities. In other words, all economic actors, including households, corporations, and government, have moved from the behavior of the analogue era to the behavior of the digital generation. The focus is on the development of the IT-industry as a key driver of economic development in the digital economy. The development of information technology directly accelerates the development of such areas as Biotechnology (BT), Material Technology (MT), and Nanotechnology (NT), thus contributing to the progress in the field of life extension technologies, as well as the liberalization of economic activities and the tendency towards globalization. The reason for this is that, thanks to the advancement of technology in the digital society, humanity can overcome the fatal limitations of the analogue society associated with time and space, mental abilities and physical strength. All this leads to the de-bordering of the existing political, cultural, ideological, economic and geographical boundaries between people (Oh Dok Hee, 2018).

3. Methodology

Due to the economic and social consequences of the transformation of the economy from analogue to digital revealed by the case of the Republic of Korea, statistical data from open sources, publications in scientific periodicals and research reports have been analyzed. Methodology of investigation includes monographic methods, comparative and systemic analysis, as well as a logical approach to the trends.

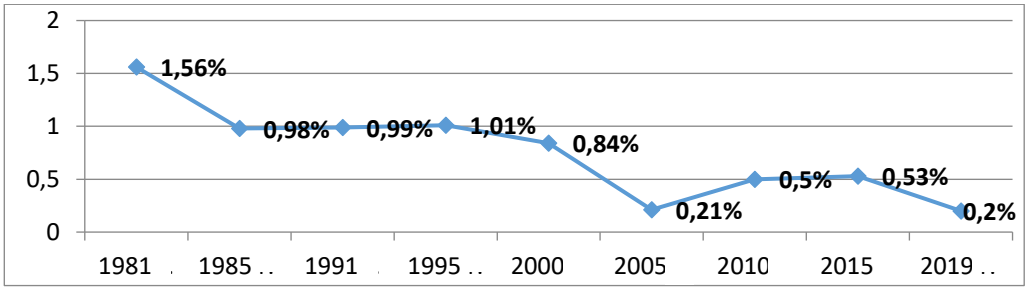
Liberalization, globalization, and the development of technology through the information technology revolution are the fundamental driving forces behind the radical changes in the Korean economy in the XXI century. The characteristic features of Korean society in recent decades have been stagnant population growth, a decline in the share of the working-age population (Figure 1), an aging population and an increase in the rate of singlehood due to a drop in the birth rate (Figure 2).

Figure 1. Changes in the share of the working-age population in the Republic of Korea, %



Source: Korean National Statistical Office (2019), available at: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=2716

Figure 2. Population growth statistics for the Republic of Korea, %



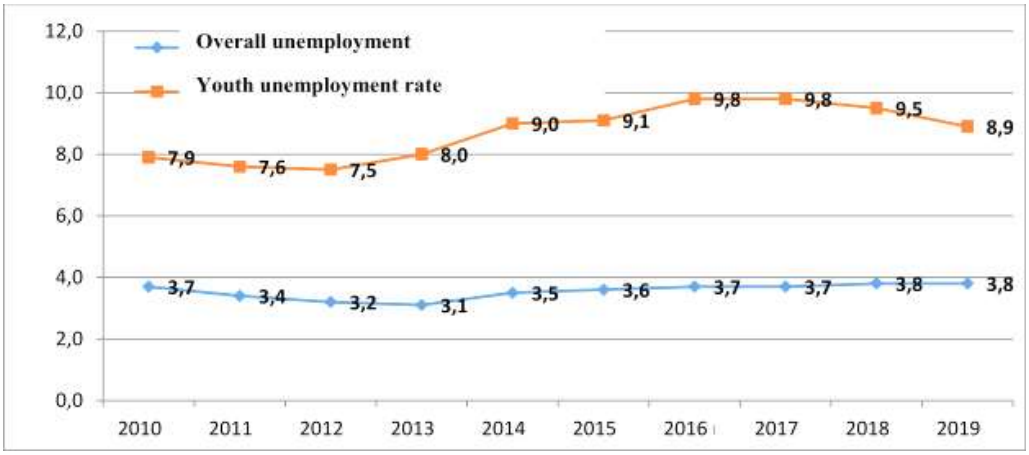
Source: Korean National Statistical Office (2019), available at: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1009

Labour production in Korea fell sharply in the mid-2000s. This is the result of internal growth in labour wages and external development of manufacturing industries in developing countries such as Vietnam and India. In particular, high youth unemployment has become a serious social problem (Figure 3).

Such phenomena can have a negative impact on sustainable economic development in the long term. In fact, the Republic of Korea has faced the problem of the need to create a new paradigm of economic policy. As a result, at the beginning of the XXI century, the Korean government began to actively

promote the transition from the analogue economy to a digital economy based on creative economic policies.

Figure 3. Youth unemployment trend in the Republic of Korea, %



Source: Korean National Statistical Office (2019), available at: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1063

As the IT-revolution progressed, it became necessary to fundamentally change the essence of the economy, and such a change consists in the transition of the economic paradigm from analogue to digital.

The following data (Table 1) show the share of the internet economy in different countries and illustrates the leading position of the Republic of Korea in this area.

Liberalization and globalization of economic activity comply with human nature. Each person wishes to freely do what, in his opinion, is most useful for him, without the intervention of third parties. Therefore, the liberalization and globalization of the economy were the results of a reaction to the environment that hinders freedom of choice.

If liberalization can be called as the process of eliminating elements that impede freedom of economic activity within one state, then globalization is the desire to achieve freedom of economic activity between countries. In other words, the progress of the IT-revolution and the resulting transition to the digital economy are becoming the main driving forces behind economic liberalization and globalization.

Table 1. Dynamics of penetration of the digital economy (or Internet economy) in the G20 countries, in GDP, %

Country	Period	
	2010 year	2016 year (predict)
Great Britain	8,3	12,4
Republic of Korea	7,3	8,0
China	5,5	6,9
EU	3,8	5,7
India	4,1	5,6
Japan	4,7	5,6
USA	4,7	5,4
Mexico	2,5	4,2
Saudi Arabia	2,2	3,8
Australia	3,3	3,7
Canada	3,0	3,6
Argentina	2,0	3,3
Russia	1,9	2,8
South Africa	1,9	2,5
Brazil	2,2	2,4

Source: *Boston Consulting Group (2012, pp. 8-9)*

In turn, economic liberalization and globalization have an impact on even greater progress in the transition to a new form of economic management. This series of changes ultimately leads to an increase in the growth potential of the economy, and an increase in the growth potential leads to an increase in economic growth in the long term. As a result, this contributes to an increase in the level of well-being of all economic entities of the country.

4. Findings: consequences of the transition from the analogue economy to digital economy

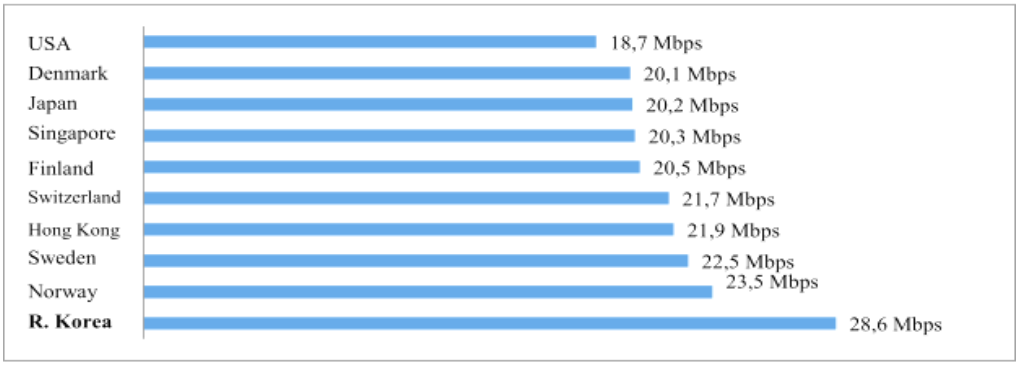
The transition from the analogue economy to digital economy as a result of the IT-revolution will lead to the following economic and social consequences.

1) Changes in the structure of the economy and business model. As the IT-revolution enters its mature phase, the paradigm of economics is shifting from analogue to digital, leading to significant changes in the widely used business model. New developments in science and technology, which have

been accelerated by the information technology revolution, have shifted the focus of the industrial structure from the heavy chemical industry to the industry of high-tech knowledge and information production that actively uses IT. It also contributes to the emergence of new service industries using IT and related technologies. The combination of IT with BT, MT and NT has formed a new engine of economic growth, which is a manufacturing industry based on advanced technologies.

2) Transformation from imitator to innovator. Such concepts as large volumes of production and the popularization of goods are characteristics of the analogue economy. However, in the digital economy, there has been a transformation towards a generation of uniqueness. In other words, there has been a change in people's thinking, which consists in the desire to possess not the goods that others have, but unique goods. Consumers have changed their behavior patterns, moving from a stage when they passively purchase goods and services produced for the personal reasons of the manufacturer, to a stage when consumers themselves actively influence the production process, expressing what kind of goods they would like to purchase based on their preferences. The development of networks based on the IT-revolution has empowered companies to offer products that meet the needs of individual consumers.

Figure 4. Top 10 countries with average internet speed in 2017

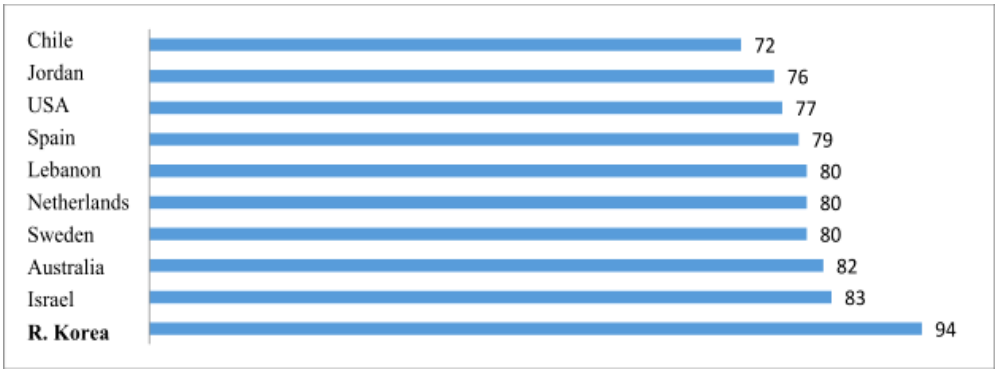


Source: Bloter & Media Inc. (2017)

The development of communication services contributes to the development of digital broadcasting services using personal blogs. This

requires the development of a high-speed information transmission network based on the Internet. The Republic of Korea is included in the top-10 countries with high internet speed (Figure 4) and with a high levels of smartphone distribution (Figure 5).

Figure 5. The level of distribution of smartphones in 2018, %



Source: Canada Talk (2018)

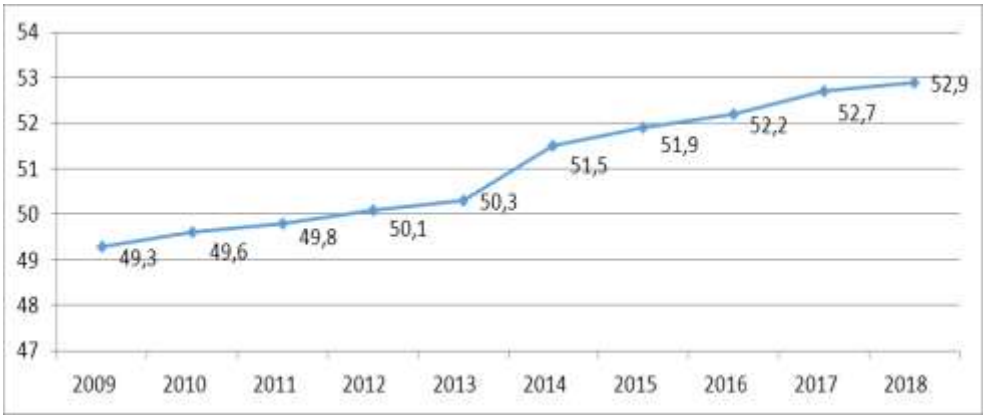
High-tech content is rapidly evolving in a variety of new business areas such as games, music and music videos, e-sports, videos, news and movies. New types of business activities, which were difficult even to imagine in the era of the analogue economy, made it possible to carry out economic activities with only a creative idea in the digital economy. In other words, the era of imitation has been replaced by an era of innovation. In the digital economy, informatization determines business success or failure. In society, those specialists in the information sphere who can create and apply knowledge and information themselves have gained much more power than those who are engaged in data processing.

3) Growth in the leisure and eco industries. The digital economy shows an increase in demand for new products and services as labour models have also changed significantly. The labour structure has changed significantly in relation to two factors. Currently, there is a trend in Korean society regarding a decrease in weekly working hours and an increase in the amount of free time. As leisure time increases, leisure industries such as tourism, sports, performances, concerts, and other entertainment are booming. In parallel with the development of the tourism industry, the associated transport services

sector, such as air travel, public transport, roads, etc., is rapidly developing. On the other hand, the leisure sector has become more than just an area of entertainment, but has also provided consumers with a growing number of opportunities for self-realization through outdoor activities based on personal experience and participation. It has also led to the growth of environmental industries such as ecotourism and other outdoor activities. The reason for this growth was that as globalization and scientific and technological progress continued, people began to strive for natural benefits and a comfortable environment.

4) Development of industries targeted at women and the elderly. In the digital economy, women's participation in economic activity is constantly expanding, while women's work is developing and improving (Figure 6).

Figure 6. The level of women participation in the economic activity in the Republic of Korea, %



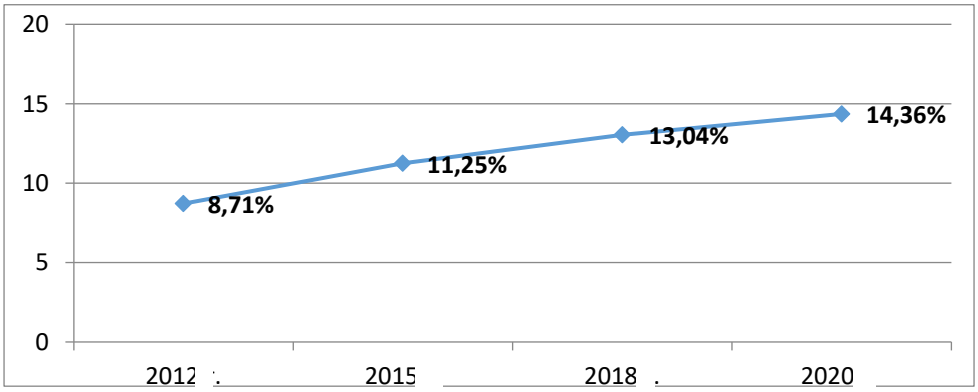
Source: Kim Han Suk (2016)

The reason for this is that the analogue economy, which emphasized the physical work of humans, has evolved into the digital economy with an emphasis on soft power. The demand for goods and services for working women has risen sharply as women's economic activity has increased. The demand for goods and services that can free a woman from some household work has increased significantly. For example, the demand for refrigerators, washing machines, dishwashers, multicookers with advanced remote control functions via the Internet has increased. Accordingly, the share of industries

related to smart home technologies and artificial intelligence (Internet of Things) is gradually increasing.

Due to the wider participation of women in economic activity, there is also a negative phenomenon of an increase in the proportion of unmarried women, which provokes a decrease in the birth rate, which has become one of the most acute social problems in the Republic of Korea. However, the increase in the number of single women has led to changes in the business model and an increase in demand for products and services appropriate to this category of consumers. There have also been major changes in the senior-centric industry. The Republic of Korea is now one of the countries in the world that is experiencing a rapid increase in the proportion of an aging population and its economic strength. As a result, the demand for goods and services demanded by the elderly is also increasing. For example, there is a growing number of educational services and training that help to prolong the inclusion of the elderly people in economic activities. The spheres of health care, medical care and therapeutic services for the older generations are also developing (Figure 7). The industry targeting seniors is medicine, medical equipment, food, cosmetics, household goods, welfare, housing, leisure, and finance.

Figure 7. Growth rate of industry focused on older people, %



Source: Slidesplayer.org Inc. (2019)

5) Leadership transition from large and powerful enterprises to small and flexible ones. While the analogue economy was the era of large and powerful players, in the digital economy the small and fast companies took the lead. In

all spheres of the economy, such as manufacturing, distribution, marketing, investment and finance, there are a growing number of small and flexible participants who are able to respond quickly to environmental changes. In other words, in the digital economy key positions are no longer occupied by the players of the heavy industry, such as steel, shipbuilding and automobile construction companies, but by economic entities of such industries as electronic, communications, distribution, financial, information, as well as representatives of the field of intellectual and information services. This phenomenon means that with the progress of digitalization, the axis of the economy is shifting towards the knowledge industry. The new stage of economic development is more consistent with those with special skills, creative and educated people than those who are engaged in physical labour. In comparison with bureaucratized large enterprises, representatives of small and medium-sized businesses are becoming more favourable, differing from the previous ones in their flexibility in a changing environment. This means that the share of SMEs and venture capital companies in the digital economy of the Republic of Korea is steadily growing (Go Jongsuk, 2015, pp. 88 – 91).

6) Strengthening of the relationship between producer and consumer. In the digital economy, the relationship between producers and consumers continues to grow in strength and influence. In the analogue economy, consumers choose from the goods produced by suppliers that they need. Accordingly, consumers did not have the opportunity to free themselves from the conditions of passive choice and consumption. In the digital economy, however, consumer demands on companies have increased, and only those companies that actively respond to and satisfy consumer needs remain in the enterprise structure. The rise in consumer power and influence is clearly related to globalization and the IT-revolution. Armed with knowledge and information, consumers can choose and shop in all markets around the world. As the power and influence of consumers in society grew, the emphasis began to shift from quantity to quality, from ordinariness to uniqueness, from uniformity to diversity, from unnecessary complexity to simplicity and ease of use, from passive to active participation of the consumer in the production process.

7) Technologization of traditional industries. IT-revolution has resulted in structural changes in existing business sectors which has significantly

increased the productivity of the economy. Information technology has pioneered a productivity revolution in key industries such as agriculture, fisheries, forestry and livestock. Besides, advanced technologies have been introduced into the production methods of secondary industries such as the food, pharmaceutical, clothing, steel, automotive and petrochemical industries. For example, in agriculture, information technology is used in all areas such as crop selection, seed purchase, land cultivation, agricultural equipment operation, and agricultural land management, management of water and temperature balance, sunlight balance, harvesting, distribution and sale, and also transfer of agricultural technologies. This technologization has the effect of increasing price competitiveness by growing efficient crops. IT-revolution transforms the industries of the tertiary sector of the economy, such as finance, transport, communications and distribution, into intelligent and information industries of a new type (Kim Seongho, 2017, pp. 22 – 25).

4.2. Expanding of liberalization

South Korean political scientist Yoon Sung Hee (2017), in his research report "Information and Communication Technology Development and Political Development", expressed the following views that the transition from the analogue economy to the digital economy due to the IT-revolution expands personal freedom in the long term. IT-revolution also enriches the economy and culture, increases the level of diversity in society, and promotes the democratization and liberalization of politics.

In the case of the Republic of Korea, to see how economic diversity has contributed to increased personal freedom, it is necessary to compare the situation in the middle of the XX century, which became the starting point of economic growth, with the situation in the XXI century. In the 1960s, per capita income in the Republic of Korea was below the 100 USD. Basic consumer goods such as clothing, food and accommodation were hard to find, while cultural life, entertainment and travel were only dreamed of. Levels of political freedom and democratization were very low, and various restrictions impeded attempts to increase the level of freedom of the population. Despite this, in the

XXI century, the per capita income index of South Korean society tends to exceed 30,000 USD.

Looking at how much the income parameters have changed, one can judge how much the standard of living in the Republic of Korea has improved. An environment has developed in the country that allows anyone to travel, study or work abroad. Besides, citizens of other countries are also relatively free to enter the Republic of Korea for work, study or tourism. The development of the social networking system (SNS) due to the IT-revolution has greatly contributed to the democratization of the Republic of Korea and the establishment of freedom of speech, which has led to an increase in the level of political freedom of every citizen.

In the digital economy, which is the result of the information technology revolution, consumer freedom has also expanded. Typically, in the analogue economy, consumers had a choice of goods and values already produced by suppliers. However, in the digital economy, consumers, based on personal preferences, have begun to take part in the process of manufacturing goods and values by suppliers. Consumers are going beyond a simple consumption model and beginning to communicate in detail to suppliers what products are necessary in the market. In other words, demand-driven production and consumption are combined. This phenomenon is called "Do it yourself", and by now it has become quite common in the Korean society. On-demand production and consumption is widespread in all areas of service, such as education, medicine and health care, sports, tourism, cultural life, etc. The widespread "Do it yourself" phenomenon also means an increase in consumer education. However, it is also important to understand the fact that this emergence was largely due to the simplification of access to the necessary knowledge and information, resulting from the IT-revolution and, in particular, the spread of the Internet. Expansion of freedom in the field of information actually influenced the expansion of consumer freedom (Go Jongsuk, 2015, pp. 110 – 112).

4.3. The phenomenon of accelerating flexibility and economic integration

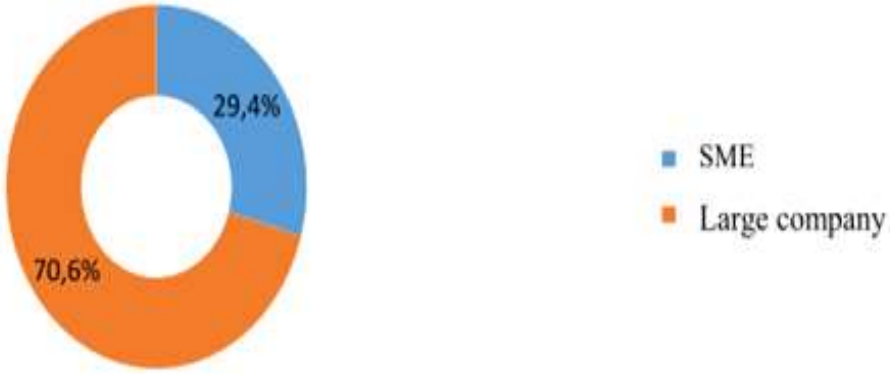
Globalization is a phenomenon where the globalization trend of economic activity extends beyond the borders of one state to the sphere of international economic relations. The rapid development of the IT-revolution at the end of the XX century led to the weakening of various barriers that existed between countries, thereby making possible the milestone progress of globalization. In the digital economy, business entities are faced with the goal of conducting economic activities around the world. Consumers have found the opportunity to purchase those products that best meet their needs from manufacturers around the world. Also, workers had a choice in which country to work, and companies, in turn, began to supply their products, focusing on consumers around the world. As a result, the share of enterprises with 100% local capital is gradually decreasing, giving way to multinational and mixed ones. More and more often, the meaning of drawing the boundaries between local and foreign enterprises is getting lost. Thanks to the IT-revolution, economic relations between Korea, Japan and China have become even closer. Consumers, employees and entrepreneurs of the three East Asian countries are becoming subjects of free economic activity, carried out regardless of geographic state boundaries. Korea, Japan and most of China form a common economic space and are united by a well-developed transport system that allows you to move freely from place of residence to place of work and back every day. Thus, in the digital economy, the economic integration of neighbouring countries is carried out at a faster pace.

In the digital economy driven by the IT breakthrough, the phenomenon of increased flexibility in economic relations is becoming more visible. The relations of economic agents that in the conditions of the analogue economy were fixed for a relatively long period of time, can be easily established or terminated as needed in the digital economy. In other words, relations between business entities are becoming more elastic. For example, among families, the number of large families is decreasing, giving way to nuclear families. Also, in the relationship between the employee and the employer, the concept of life-long employment in one company is losing its relevance. However, flexibility in hiring and dismissal increases the level of instability among workers.

Business relationships are also changing. Due to the IT-revolution, competition between companies has become much fiercer. In the analogue

economy several large enterprises through their exclusive ownership of information were able to form cartels. Small and medium-sized enterprises (SMEs) had no choice but to enter into long-term relationships with such large enterprises. However, as information costs have declined in the digital economy, SMEs have no longer needed to maintain long-term trade relationships with a small number of large corporations. As a result, the Republic of Korea is currently undergoing significant changes in the conglomerate system. The digital economy is becoming an environment conducive for SMEs, which are more flexible and responsive than too large and slow corporations. In addition, the growth of venture capital companies directly related to the IT-revolution is the most important feature of the digital economy (Go Jongsuk, 2015, pp. 128 – 130). Figure 8 shows that the production volume of large campaigns in the ICT sector is higher than that of SMEs.

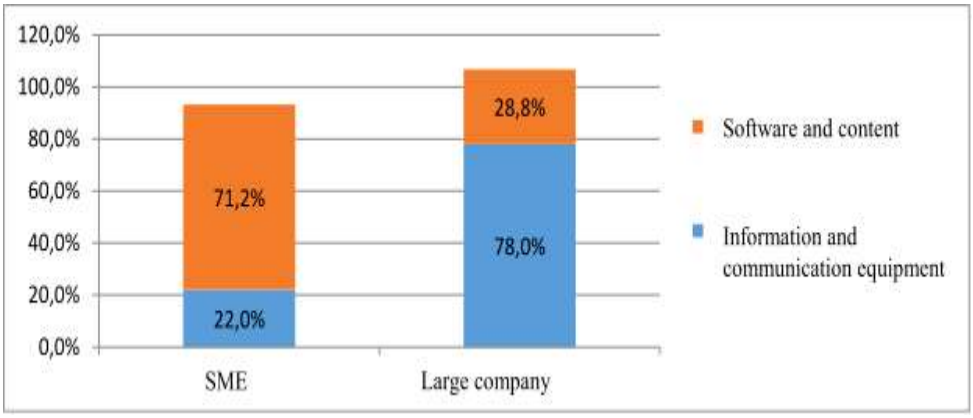
Figure 8. ICT industry production volume by a company in 2017



Source: Chungnam TechnoPark (2018)

However, looking at Figure 9, one can see that the output of SMEs by ICT sectors is higher than that of large companies. These facts show that SMEs play an important role in the digital economy driven by the information technology revolution.

Figure 9. Share of ICT industry products by sector in 2017



Source: Korean National Statistical Office (2019), available at: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1009 [visited on 29.07.2019]

4.4. Efficiency of resource allocation and balanced development of regions

As the digital economy developed, it became possible to conduct economic activities without time and space constraints. For example, in the field of finance, such barriers have been overcome by the progress of E-trading (electronic commerce) and E-banking (electronic banking services) services.

In addition, manifestations of the digitalization of the economy, such as Internet banking, are helping to increase production capacity by reducing the transaction costs associated with economic activities. Reducing transaction costs contributes to an increase in the welfare of economic agents, thereby ensuring a truly efficient allocation of resources. In other words, savings in operating costs compared to the analogue economy system result in more efficient savings and investments.

Moreover, due to the fact that education and training began to actively develop in production, technological progress is further intensified. First of all, in the digital economy, the principles of the law of diminishing returns, which hampered economic activity in the analogue economy, lose their relevance, and they are replaced by the principles of the opposite theory of increasing returns (Kim Seongho, 2017).

The Increasing Returns of Scale is an effect during which output increases exponentially as the number of incoming factors increases. This principle contradicts the provisions of the Diminishing returns of scale, still applied in the traditional industrial economy. Increasing Returns of Scale is applied in the areas of intellectual capital and knowledge-based economics (information industry, software industries, culture and services). For example, the use of knowledge and know-how acquired in the process of work by the employees of companies becomes the basis for further development and creation of new know-how, since intellectual capital is not a limited resource and, based on the existing knowledge and experience, it is possible to develop infinitely further.

In the system of mass production, the decreasing returns law dominates, but in the high-tech industry, which is a knowledge-based production system, as well as in the Internet business, dominance is consolidated with the theory of increasing profitability. This leads to an increase in the socio-economic efficiency of resource allocation.

The digitization of the economy greatly contributes to the balanced development of regions through the large-scale expansion of clusters (when used as an economic term, it denotes a network formed in a special territory between companies, universities and research laboratories to create, based on the synergy effect, new knowledge and technologies in the field of information exchange and commercialization of developments through close interaction) and hubs (the centers of transport and aviation, connecting nearby cities). Expanding access to markets and suppliers, high-quality financial services, the availability of a highly skilled workforce, education, real estate services, health care, environment, culture and other leisure, due to the IT-revolution, is leading to accelerated urbanization. New cities are becoming dynamic and creative areas, where advanced knowledge and information can be easily accessed, high-quality networks between businesses and regions are easily formed, and areas that provide the benefits of an international trade hub. For example, such a city is the city of Songdo, located near Incheon International Airport (Kim Kiwuan, 2017, pp. 5 – 7).

4.5. Changing the role of government

Changes in the economic paradigm also influenced the changing role of government in the economy. In the analogue economy, the government planned, managed, and controlled many aspects of business. In the digital economy, however, such control is not only unnecessary, but, moreover, it becomes impossible.

As the trend towards liberalization developed, government intervention and control over the private sector weakened. As the proportion of aspects that the private sector can manage on its own has increased, the need for the government to plan, promote, manage and coordinate all economic processes has been eliminated. This means that the economic potential of the private sector has increased in the digital economy and the self-regulation function of the market has been strengthened. Also, the IT-revolution has contributed to the establishment of transparency in government functions. In the analogue economy, the government was able to control the private sector through a monopoly on knowledge and information. However, thanks to e-government, e-procurement and e-taxation, many things for which the government was previously responsible, were computerized and became open (Kim Seongho, 2017, pp. 59 – 61).

Furthermore, the force that has changed the role of government in the digital economy lies in the progress of globalization. The evolution of globalization and the acceleration of economic integration have increased the need to follow international standards across the entire spectrum of administrative functions.

This significantly reduced the ability of the government of an individual state in many areas of economic policy, including financial and exchange control, government taxation and customs regulation. It became impossible not to follow global standards when regulating the economy. The current situation had a favorable effect not only on the state of the economy of the Republic of Korea, but also on the liberalization and democratization of society.

4.6. Increasing of the intellectual property objects and changing in their rights defense

Development of the digital economy leads to very quick growth of intellectual property (IP) objects quantity and their types. Denton (2011) denotes, that "the rapid growth of the digital economy… presents huge opportunities for economic and social development, creating global markets for content and rights holders" and selects the following areas of intellectual objects in the digital economy: patents; trademarks; design; copyright and related rights. In the digital world, new specific intellectual property objects appear: artificial intelligence algorithms, user and software generated content, crowdsourcing objects, etc. "Social networking sites are widely used for publishing and sharing both user generated content and by content owners sharing their materials... The social networking eco-system has been active in developing guidelines and taking action to manage copyright content" (Denton, 2011, p. 18).

Growth of the intellectual property objects quantity and their types, enhancing of the possibilities of their sharing leads to the problems of conflicts of interest of consumers and intellectual rights owners. The Internet provides possibilities of sharing the intellectual property objects over the world. And consumers in developing countries are not ready to pay the same price for the IP objects as the more rich consumers in developed countries. IP rights violation became very serious topic in the digital world. Antitrust and free use regulation, digital rights management and technological protection measures have high significance for balancing these contradictions. Digital rights management can limit copying, restrict the use of an object for a limited period of time, or allow an object to be reproduced only using certain programs and techniques. Technological protection measures include software or hardware that makes it difficult to create copies of an IP object, or allows a copy to be created through a controlled process (Ahmedov et al, 2017, p.115).

5. Conclusion

The conducted research allowed the economic and social consequences of the economic transformation from analogue to digital in the Republic of Korea to be revealed. It confirms the hypotheses that digital economy is a key factor for the development of economic growth of not only national, but also global economies in the long-term in such areas as the structure of the economy and business model, economic integration and liberalization, resource allocation and balanced development of regions, the role of government, and intellectual property system.

The development of the digital economy in connection with the progress of the IT-revolution contributes to the liberalization and globalization of the economy of the Republic of Korea. The digitalization of economic processes in the Republic of Korea was carried out by replacing hardware and software. Narrowly defined, the digitalization of hardware and software has been achieved due to:

1) continuous growth and development of the digital industry, including electronics, communications and electricity;

2) digitalization of industries such as steel, automobile construction, pharmaceutical, finance, etc.;

3) emergence of new digital services such as finance, health care, education, distribution, sports, leisure and tourism;

4) development and humanization of technologies.

Digitalization of the economy has great influence on the system of intellectual property rights defense. Digital rights management and technological protection measures play important role in balancing of the interests of copyright owners and consumers.

Regarding digitalization on the part of the software in a broad sense, with the development of digital technologies, there have been changes in the relationship between economic agents, in the quality, quantity and type of products; quality, quantity and type of factors of production, method of production, method of distribution, consumption, saving and investing, labor and leisure, finance, training, technology development and other areas. These

changes have virtually affected the entire life of the Korean people, including politics, diplomacy, security, society and culture.

Broadly speaking, changes in software resulting from the IT-revolution are accompanied by changes in the orders, norms and structures that prevail in society, as well as changes in ideologies, trends and policies. Eventually, the analogue economic paradigm that dominated Korean society underwent a transformation and became digital. In the digital economy, it was possible to overcome excessive government control, uniformity, closed ideology and achieve political liberalization and autonomy, as well as diversity and openness in the private sector. These changes ultimately led to an increase in the growth potential of the economy, which, in turn, caused an increase in economic growth and, as a result, an increase in the welfare of economic entities.

Shortcomings in this research are incomplete analysis of the specific resources involved in the digital economy, such as staff resources for digitalization of business-process and for work in conditions of digital business-process. It may be the topic of future scientific work. Other avenues for continuation of this research are investigations of the possibilities of additional investment attraction and optimal investment distribution in the digital economy.

The conducted analysis has significant implication for identification of regularities in the transition from analogue to digital economy, and for explanation of Korean phenomena in becoming one of the digital economy leaders in the world. The main added value of the research is the possibility of using the experience of the Republic of Korea by other countries with an accounting of their specifics. Results obtained in this research may be used in transition from strategic to medium-term planning of economy digitalization and prediction of the consequences of this process, in the development of strategies for digital economy development.

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