

Digital Transformation Enablers and Barriers in the Economy of Kazakhstan

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Abstract

This study aims to analyze the digital performance of Kazakhstan through dynamic analysis of national statistics and international indices as Global Innovation Index and ICT Development Index. The research combines three stages: analysis of digital transformation policies performance, review of ICT industry development, and comparative analysis of the positions of Kazakhstan, Turkey and South Korea as a benchmark in the international indices. This research findings show that despite great efforts of Kazakhstan in digitalization, the ICT industry contribution does not increase, it even falls. The international indices demonstrate that the reason is the weakness of the country in skills, venture capital, and innovation linkages. This leads to low knowledge, technology outputs, and creative outputs. The enablers of digital and overall innovation advancement of economy are identified. According to the international rankings the country has been doing its best in Access and Use areas. Another enablers are good business environment, ease of starting a business, protecting minority investors, and FDI inflows. The findings help to draw recommendations for strategic directions in order to improve the digital performance in Kazakhstan. The main limitation of this study is a lack of dynamic information on positions of Kazakhstan in other international indices related to digitalization.

Keywords : Digital Transformation, ICT, Digitalization, Business, Innovation Development, Kazakhstan, Turkey, South Korea

JEL Classification Code: O30, O33, O38

1. Introduction

Digitalization is one of the strongest trends that are changing the global economy today. The era of digitalization is slowly and surely, and at the same time inevitably changing the face of the industry, the structure of economies, and the whole way of life and thinking.

Digitalization has the potential to create tremendous value for society and business, estimated at about \$100 trillion. The vast majority of this value most likely belongs to society (WEF, 2016). To date, 84% of the world's inhabitants have the opportunity to use broadband access and regularly access the global networks using fixed and mobile broadband. Since 2015, developed and developing countries are moving to the next stage of regulation and development of the digital environment, focused on improving the efficiency of ICT application and digitization of all aspects of the life of the state, business and society (Lastovich, 2017).

For businesses, digitalization is an opportunity to increase efficiency by both reducing costs and implementing new business models. The main impact of the development of the digitalization on enterprises is associated precisely with changes in production processes that ensure a reduction in fixed costs (Melnyk & Salin, 2018), achieving higher overall organizational performance and creating competitive advantages that are equally important for both survival and growth (Peppard, 2016). It is worth noting, the return on investment in new digital technologies for industry leaders is 2.5 times higher than among followers (WEF, 2018).

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Currently, chief information officers (CIOs) are faced with the challenge of overcoming the second era of corporate ICT technologies and the third era of “digitalization” - the transition from ICT management as a business within a business to a stage of deep innovation that goes beyond process optimization, operating a wider universe of digital technologies and information, as well as more integrated business and IT innovations (Gartner CIO Agenda Report, 2014).

In world practice, the term “digital transformation” is used to describe a profound transformation of business and organizational activities, processes, competencies and models to fully utilize the changes and opportunities for combining digital technologies and their accelerating impact on society in a strategic and prioritized manner, taking into account current and future changes (i-Scoop, 2018).

For the digital transformation of the economy, recognition of the need for digitalization of socio-economic systems at the state level and the allocation of resources (Popkova et al., 2018), are key prerequisites for the development of innovation, in particular, the consistent development of innovative high-tech industries, the development of information and communication technology infrastructure (Melnik & Salin, 2018; Nurlanova et al., 2019), the dynamic development of business, talents, and a favorable environment (WEF, 2017; Chulanova et al., 2019). At the same time, the main barriers to digitalization on a global scale are: de-globalization and protectionism, which reduce global GDP, state inefficiency in the development of a favorable environment, lack of innovation, and uneven technological development due to uneven human capital (WEF, 2017).

Kazakhstan is among upper-middle income countries, for which the ICT Development Index (IDI) grew by almost 70% since adoption of the State Program “Information Kazakhstan 2020” in 2013. It marked the enhanced formation of the base for the development of the digital economy. As a result of the implementation of the Program over the 2013-2017 period, the share of Internet users increased from 63.3% to 78.8%, the computer literacy rate of the population increased from 63.2% to 78.2%, E-commerce share in total retail increased from 0.5% in 2013 to 1.2%. In three years of the program implementation, 70% of the planned activities were completed; target indicators were exceeded by 40%. However, the share of the ICT sector in the GDP grew only slightly, from 3.5% to 3.6%. The share of expenditures on ICT innovations decreased from 0.15% to 0.03% (5 times), and the level of innovation activity in the ICT sector fell from 16.7% to 12.6%.

This study aim is to analyze the digital performance of Kazakhstan through dynamic analysis of national statistics and international indices as Global Innovation Index and ICT Development Index. This approach will be helpful to reveal the enablers and the barriers of digital advancement

of economy and to draw recommendations for strategic directions in order to improve the digital performance in Kazakhstan.

2. Literature Review

2.1. Definitions of Digitalization and Digital Transformation

The global economy is on its way to digital transformation. Numerous studies show a significant dependence of the level of economic development on the indicators of access and use of ICT by enterprises and the public. International organizations are involved in research on maximizing benefits for the growth of value added of business and society and the potential to minimize losses from digitalization.

According to Gardner glossary (2018) digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business. The broader definition is given by i-Scoop.eu (2018): digitalization means using digital technologies and data (digitized and initially digital) to generate income, improve business, replace/transform business processes (and not just digitize them), and create an environment for digital business that keeps digital information in focus. A more focused definition “digitalization is use of digital technologies to innovate a business model and provide new revenue streams and value-producing opportunities in industrial ecosystems” (Parida et al., 2019). Briefly put, digitalization refers to the use of digital technology, and probably digitized information, to create and harvest value in new ways (Gobble, 2018). Another view supposes that digitalization is the state of an organization or a society referring to its current digital development and usage of ICT innovations. Digitalization takes into account social as well as technical elements (Bockshecker et al., 2018).

Scientists identify three stages (or three waves) of digitalization (Yoo et al., 2010):

1. Transition of analog content to digital content. This is a technical digitization of analog content and services without fundamental changes in the structure of the industry. In a nutshell, this stage can be characterized as the digitization stage.

2. Separation of devices that have historically been closely related. For example, media services such as music, books, e-mail, and movies can be delivered through various types of networks using multiple devices.

3. The emergence of new products and services. Devices, networks, services, and content that were created for specific purposes are re-mixed for other uses.

Digitalization leading to digital transformation is required to entirely benefit society. Digital transformation is

the use of new digital technologies, such as social media, mobile, analytics or embedded devices, in order to enable major business improvements like enhancing customer experience, streamlining operations or creating new business models (Fitzgerald et al., 2013). Bley et al. (2016) state that “ICT triggers and enables this “transformation” of the company towards a holistic network” and that organizations should undergo the “digital transformation to remain competitive in global markets”. Another recent definition is given by German researchers: “digital transformation is a “holistic approach to move government organizations from simple digitization efforts to cultural, managerial, procedural, and developmental changes of the organization as a whole” (Bockshecker et al., 2018). To compare, “digital transformation is a profound transformation of business and organizational activities, processes, competencies and models to fully utilize the changes and opportunities for combining digital technologies and their accelerating impact on society in a strategic and priority manner, taking into account current and future changes (i-Scoop.eu, 2018).

Digitalization and digital transformation are prerequisites to digital economy. There is no commonly-accepted definition of digital economy in the world. Deloitte Company defines digital economy as “the economic activity that results from billions of everyday online connections among people, businesses, devices, data, and processes. The backbone of the digital economy is hyperconnectivity, which means growing interconnectedness of people, organizations, and machines that results from the Internet, mobile technology and the Internet of Things”. Dahlman et al. (2016) define it as the amalgamation of several general-purpose technologies and the range of economic and social activities carried out by people over the Internet and related technologies.

Development of Internet and related technologies require a good performance of Information and Communication technologies, first of all. This performance is measured through such criteria as ICT access, ICT use, ICT skills, etc. Thus ICT plays a crucial role in digitalization and digital transformation of business and therefore whole economies. Development of ICT is measured by ICT development index. Some researchers state that the IDI has disadvantages, mostly related to its bias and uncertainty (Dobrota et. al., 2015). However, this is the most well-established index in the world that measures ICT development in the largest number of countries.

2.2. Streams of Research on Digitalization

Regarding the literature on the digitalization there are two main streams of research.

The first focuses on the factors of ICT adoption. It is stated that in countries with higher levels of ICT adoption, the digitalization pattern is explained by Gross Domestic

Product (GDP), service sector, education, and governmental effectiveness (Vicente & López, 2006). In contrast, in developing countries, population age and urban population are positively associated with the ICT adoption, while Internet costs impact negatively (Billon et al., 2009). In particular, income and education as well as research and innovation efforts explain the diffusion of the Internet, computers and mobile telephony in the European Union (Melnik & Salin, 2018). ICT infrastructure and access are also supposed to be the most important factor influencing the ICT adoption and digital divide (Hanafizadeh et al., 2009).

The second stream deals with ICT as growth links. For example, ICT plays a major role in the growth of high and upper-middle income groups, but fails to contribute to the growth of the lower-middle income group countries (Yousefi, 2011). The studies confirm the positive relationship between Internet and economic growth (Li, 2019). ICT diffusion can improve economic growth in high-income countries, but in middle and low-income countries, only mobile growth can raise economic growth, whereas increasing Internet or secure Internet servers cannot (Cheng et al., 2020). In particular, mobile phone, Internet usage, and broadband adoption are the main drivers of economic growth in the Middle East and North Africa and Sub-Saharan African developing countries (Bahrini & Qaffas, 2019). Health care systems should concentrate on digital inclusion to increase health literacy, disseminating health information and facilitating medical facilities (Afroz et al., 2020).

Kazakh researchers cover mostly sectoral studies. The most popular study is on public services digitalization (Karmys et al., 2018; Useinova et al., 2018). The influence of digitization in agriculture (Akhmedyarov, 2019; Alchimbayeva et al., 2019), tourism (Ziyadin et al., 2019), and education (Sapargaliyev, 2011). The influence of digitalization on economy and innovations in Kazakhstan is of high interest for local researchers as well (Francesco et al., 2020; Kireyeva et. al., 2018; Alibekova et al., 2019).

The literature review makes it clear that a study of innovation and digital performance of Kazakhstan is a relatively new topic. Moreover, there is a significant research gap in studying barriers and enablers of digital transformation of the economy of Kazakhstan. This study can be interesting for local authorities of Kazakhstan in drawing recommendations for public policy in digitalization.

3. Research Methods and Materials

This research explores two methodological approaches: systematic review of relevant scientific literature and analysis of national secondary data of the national statistics agency and the international indices as ICT Development Index and Global Innovation Index. A ‘systematic review’ refers to a literature review associated with a clearly formulated

research question that uses systematic explicit methods to identify, select, and critically appraise relevant research from previously published studies related to the question at hand (Cochrane collaboration, 2005). Analyzing the secondary data from the ICT Development Index and the Global Innovation Index allows revealing the parameters, enabling and disabling the promotion of countries in those indices.

The main limitation of this study is the lack of information on positions of Kazakhstan in other international indices related to digitalization.

The Global Innovation Index (GII) provides detailed metrics about the innovation performance of 129 countries and economies around the world. Its 80 indicators explore a broad vision of innovation, including political environment, education, infrastructure and business sophistication. GII is published by Cornell University, INSEAD, and the World Intellectual Property Organization, in partnership with other organizations and institutions, and is based on both subjective and objective data derived from several sources, including the International Telecommunication Union, the World Bank and the World Economic Forum. The Global Innovation Index measures digital development as well within the Infrastructure evaluation. Infrastructure pillar includes such sub-pillars as ICT, General infrastructure and Ecological Sustainability. ICT sub-pillar measures development of ICT use, ICT access, Governments' online service and E-participation (GII, 2019).

There is a range of other indices on innovation and digitalization issues: Bloomberg Innovation Index, The Digital Economy and Society Index, Digital Society Index, Euler Hermes Enabling Digitalization Index, IMD World Digital Competitiveness Index, EY Global FinTech Adoption Index, etc. However, they have different focuses (social, financial, economic) or they do not cover Kazakhstan.

ICT Development Index (IDI) is a composite index that combines 11 indicators into one benchmark measure. It is used to monitor and compare developments in information and communication technology (ICT) between countries and over time. IDI measures digital performance of countries through Access, Use and Skills criteria. IDI is represented by the International Telecommunication Union (ITU) in the annual "Measuring the Information Society" Report since 2009. The main objectives of the IDI are to measure:

- 1) the level and evolution over time of ICT developments within countries and the experience of those countries relative to others;
- 2) progress in ICT development in both developed and developing countries;
- 3) the digital divide, i.e. differences between countries in terms of their levels of ICT development;
- 4) the development potential of ICTs and the extent to which countries can make use of them to enhance growth and development in the context of available capabilities and

skills. Some studies revealed IDI drawbacks related to its bias and uncertainty (Dobrota et al., 2015). To ensure well-grounded conclusions, this study will analyze ICT index of the Global Innovation Index as well.

The preference is given to the Global Innovation Index and ICT Development Index because:

- they are the most specialized in measuring innovation and ICT development and cover both Kazakhstan;
- they are well established: they exist for a long time and cover a large number of economies: IDI has been published annually since 2009 and covers 176 countries while Global Innovation Index was started in 2007 by INSEAD and covers 129 countries.

The research methodology differs from others as it combines two international indices in analyzing digital transformation barriers and enablers. This allows comparing criteria from two different sources.

4. Results and Discussion

4.1. Analysis of the Digital Performance of Kazakhstan at a National Economic Glance

As noted, the share of the ICT industry in the country's GDP was 3.6% in 2017. The ICT industry consists of a telecommunications and IT market. The volumes of both markets are growing annually compared to previous periods. In previous years, the volume of the telecommunications market has always exceeded the volumes of the IT market, and the proportion of shares in the ICT industry has remained at about the same level. However, over the past three years, the share of the IT market began to grow and increased from 29% to 37%. Over the past year, the IT market in Kazakhstan has shown significant growth, and in 2017, the market volume was 123% compared to the previous year. The reason for this is an increase in the volume of the IT equipment market, and an increase in the IT services market. At the same time, the volume of licensed software decreased by 29% compared to last year.

The number of legal entities in the ICT sector is increasing annually, and by the end of 2017, the total number was 5,888 companies, of which 52% work in the area of "Computer programming, consulting and other related services". In terms of the number of individual entrepreneurs in the ICT industry, the largest number of companies (41%) work in the same sphere, and also a large share (27.5%) of individual entrepreneurs in the field of "Repair of computers and communication equipment".

The costs of enterprises for information technology in the first five-year period of industrialization increased by 60%, in four years of the second five-year plan – by almost 30% (see Table 1). At the same time, the ratio of these costs

Table 1: The main indicators of development of the ICT sector of Kazakhstan (2010-2018)

Indicators	2010	2014	2018	Growth rate, %	
				2014 / 2010	2018 / 2014
The share of information technology costs in GDP, %	0,68	0,61	0,52	89,7	85,2
The cost of information technology, total, million KZT	147 538,30	237 079,36	305 217,4	160,7	128,7
The share of employees in the field of Information and Communication “, %	1,35	1,88	1,91	139,2	101,6
The share of IT-specialists among the employed population, %	0,34	0,34	0,43*	100,0	126,5

to GDP tended to decrease, which was due to the lagging rate of industry growth compared with GDP growth rates.

According to 2017 data, the most expenses for ICT are carried out in the branches “Wholesale and retail trade; repair of motor vehicles and motorcycles” -31%,” Information and communication” - 13% and “Mining and quarrying” and “Manufacturing industry” - 8.8% each, “Professional, scientific and technical activities” - 8.4% , “Construction” - 8.0%, “General Government Administration” - 7.2%, “Transport and Storage” - 5.6%, “Healthcare Activities” - 2.6%, and “Electricity Supply, Gas Supply, steam and air conditioning” -1.7%.

The first five years of industrialization also increased employment in the field of “Information and Communication” by 40%; this indicates a significant expansion of this sphere. However, the number of employed ICT specialists – a less elastic factor requiring a temporary lag for training specialists – tended to increase only in the second five-year period.

In general, the information technology sector is developing ambiguously: against the background of growth in production in the ICT sector, net exports are declining, and vice versa (see Figure 1 and 2).

This can be explained by the fact that the development of production of goods in the IT sector is closely associated with the import of components, raw materials and materials, which once again confirms the need to localize this production sector within the country.

Telecommunication equipment dominates both in the structure of exports (28.7%) and in the structure of imports (4.6%) according to 2017 data. However, the volume of exports of this product has a clear downward trend (2.5 times in 2013-2017). Analysis of changes in the structure of foreign trade leads to the conclusion about doubling the share of exports of ICT goods in foreign trade in the field of ICT (see Table 2).

The total volume of foreign trade in the ICT sector showed an increase until 2014, in 2015 there was a decline of 53%, associated with a general decline in export figures and import of the Republic of Kazakhstan.

As already noted, the enterprises of the industry “Wholesale and retail trade; repair of cars and motorcycles”

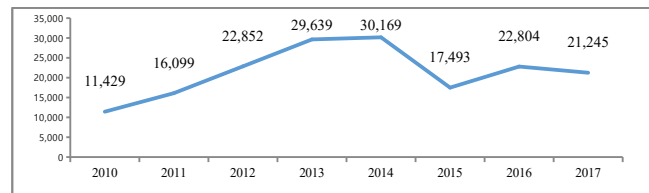


Figure 1: Volume of manufactured industrial products (goods, services) in the ICT sector, million KZT

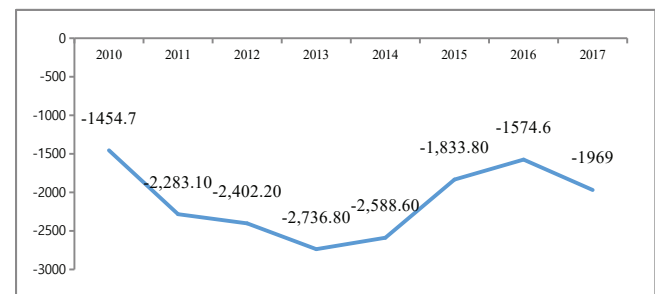


Figure 2: Net exports of goods in the ICT sector, million USD

ranked first in ICT costs (31%). This is due to the development of e-commerce in the field of trade. So, for 2013-2017 the share of e-commerce in total retail sales increased from 0.5 to 1.2%, the volume of sales of services via the Internet increased 3.7 times (see Table 3).

According to western researchers, by 2040, 95% of purchases will be made online. The experience of foreign countries shows that there is a huge potential for growth in this area. In the field of e-commerce, China leads with a share of 23.7% of national retail trade, the EU countries - 14.8%, the USA - 10.8% and South Korea –7.2%. It is found that Internet use has more impact on trade in non-high income countries than in high-income countries

(Meijers, 2014).

In 2018, the target indicator of the share of e-commerce was fulfilled and amounted to 2.9%, in 2025, e-commerce is expected to make 24% of retail sales. The number of online shoppers in 2018 was 2.32 million people, by 2025 it could reach 15 million people. This opportunity can be expanded

Table 2: Dynamics of export share in foreign trade turnover in the ICT industry of Kazakhstan for 2007-2017.

	2007	2009	2011	2013	2015	2017
The volume of foreign trade in the ICT industry, mln. USD	1493,7	1547,2	2224,7	3055,6	2042,4	2133,0
Export share in foreign trade turnover, %	1,9	3,4	2,9	5,2	5,1	3,8

Table 3: Volumes of the e-commerce market in Kazakhstan, 2013-2017

	2013	2014	2015	2016	2017
The share of e-commerce in total retail, %	0,5	0,7	0,8	1	1,2
The share of e-commerce in total wholesale, %	0,4	0,3	0,4	0,4	0,4
The volume of sales of services via the Internet, mln. KZT	71256	73488	155 732	226 440	264 523

using the transit potential of Kazakhstan between China and Europe (Bejsenbaev, 2019). At the same time, experts note the following shortcomings and barriers to the development of e-commerce in Kazakhstan: weak government regulation, lack of competence and awareness, insufficient infrastructure development, cyber security problems, and gaps in educational programs of universities.

Kazakhstan is quite effective in the development of ICT infrastructure and the introduction of government e-services. Over the past decade, the cost of ICT enterprises and industrial output in the ICT sector has doubled, the share of people employed in the Information and Communications sector increased by 40%, and the share of IT specialists in the employed population grew by 25%. The most ICT-intensive industry is the retail industry. In 2025, the planned indicator of the share of e-commerce in this sector will be 24% against 2.9% in 2018.

The human resource factor plays a crucial role in the intensification of the digitalization of the economy. At the state level, it provides sufficient support for the system of education and training at all levels, starting from secondary school, ending with retraining and advanced training courses. The share of grants for training in ICT specialties over the past five years has almost doubled. Employment in the field of “Information and communication” is expanding at a fairly rapid pace. This is evidenced by the growing need of enterprises for ICT specialists. Also, the objective reasons for this situation may be structural unemployment in this industry, due to the inconsistency of the level of qualifications of graduates. The situation is aggravated by the migration of personnel, mostly to the CIS countries. In this regard, the development of the National Qualifications System is a necessary, but insufficient measure. A systematic approach

is needed to address personnel security issues, including by encouraging an influx of highly qualified specialists using migration mechanisms and tools.

4.2. Analysis of the Digital Performance of Kazakhstan on the International Arena

The positive trends in the position of Kazakhstan in IDI indicate the relative effectiveness of the policies and measures taken to accelerate the development of digitalization in Kazakhstan. For comparison, Asian countries - the Republic of Korea and Turkey - were taken.

In the ICT Development Index (IDI) rank of Kazakhstan grew by almost 70% in 2013-2017. In Turkey - 37.6%, Korea - by 4.6%. If Turkey in 2010 ahead of IDI Kazakhstan by 0.4 points, in 2017 positive balance shifted towards Kazakhstan, which is now 0.71 points ahead of Turkey.

By this Index, in 2017, the leader was Iceland, which is ahead of Korea - the leader in 2014-2016. A negative factor in the maintenance of Korea in this Index is the relatively low index of the Access to ICT subindex, while in other subindexes Korea is ahead of Iceland and also leads the world (see Figure 3).

IDI is divided into three sub-indices (*Access sub-index*, *Use sub-index*, *Skills sub-index*).

For the “Access” sub-index, the positions of Kazakhstan increased by 63.8%, Turkey - 26.8%, Korea - 7.8% for the period under review - 2010-2017. Positions of Kazakhstan in the “Use” sub-index IDI increased four times (395.1%), Turkey - two times, Korea - only by 10.9%. For the IDI “Skills” sub-index, there is a slight decline in Kazakhstan (by 6.3%), Korea - by 7.5%, while in Turkey the dynamics is positive (+ 10.5%) (see Figure 3).

In the GII ranking, Kazakhstan's positions on this sub-index have been steadily declining: over the past five years, the country has lost 20 positions, having shifted from 23rd to 43rd place, whereas, for example, Turkey has risen by 15

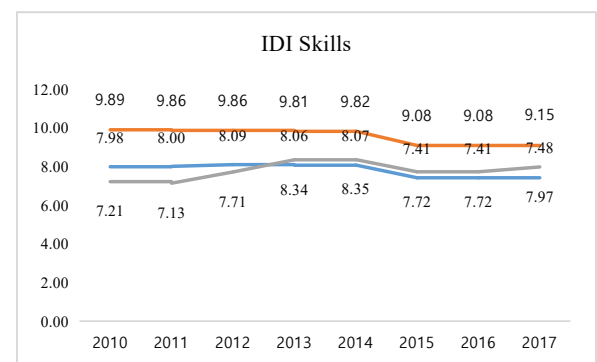
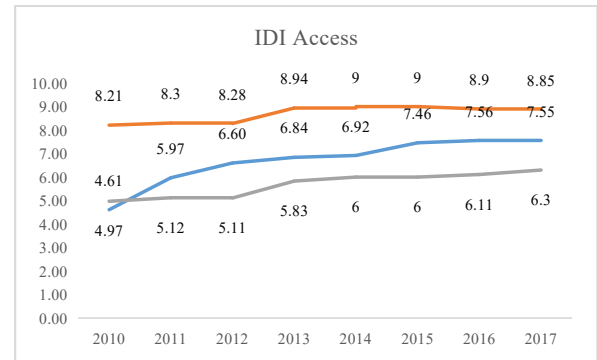
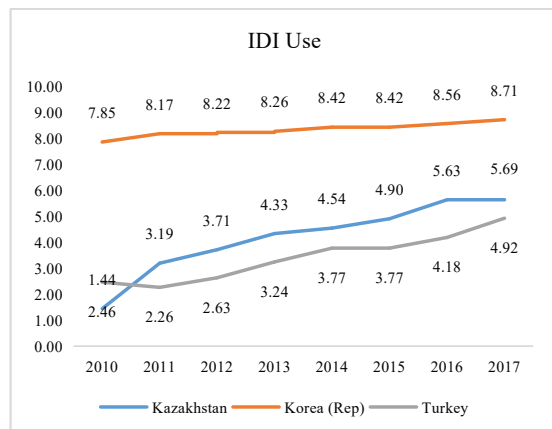
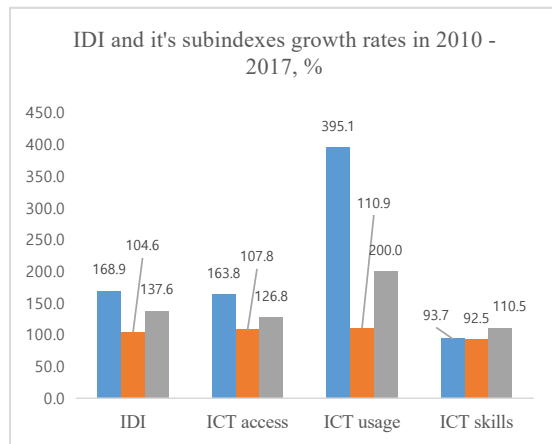
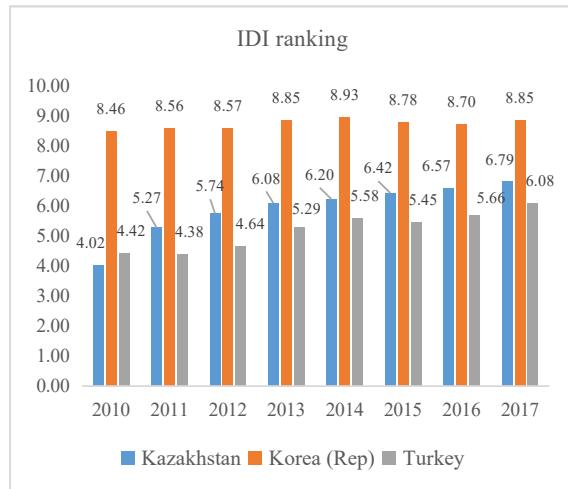


Figure 3: ICT Development Index (IDI) dynamics for Kazakhstan, Turkey and Korea

points. In terms of GII, a decline of 1.33 points is observed (from 32.73 to 31.4). At the same time, the GII of Turkey rose by 1.37 p., of Korea - by 3.29 p.

Turkey made a significant two-fold jump in the ICT GII sub-index, which was reflected in the rise in Turkey's position by 15 points in the ICT GII ranking. Korea sub-index rose 4.3 positions. As a result, Korea rose 15 points in the ranking. The Republic of Korea lost one position, losing its leadership to Great Britain. The sub-index ICT GII of Kazakhstan grew slightly - by 1.37 points. However, in the ranking over the past five years Kazakhstan has lost 20 positions, having shifted from 23rd to 43rd place (see Figure 4).

The analysis shows that the loss of positions in this sub-index of both Kazakhstan and the Republic of Korea is due to the deterioration of the indicators "Online Government Services" (by 2 and 6% respectively) "Electronic Participation" (by 37.5 and 3%, respectively).

In conclusion, the analysis shows that Kazakhstan lags behind Turkey by 10 years according to the size of the ICT industry in the country's GDP: it was 3.6% in 2017 while in Turkey it was 3.5% already in 2010 (YASED, 2012). The expenditures of enterprises on ICT are growing, but their size in GDP decreases due to lower rate of ICT industry growth. The highest (31%) level of ICT expenses are carried

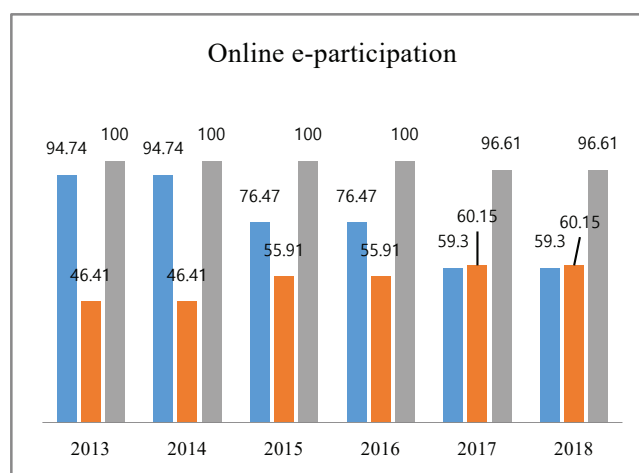
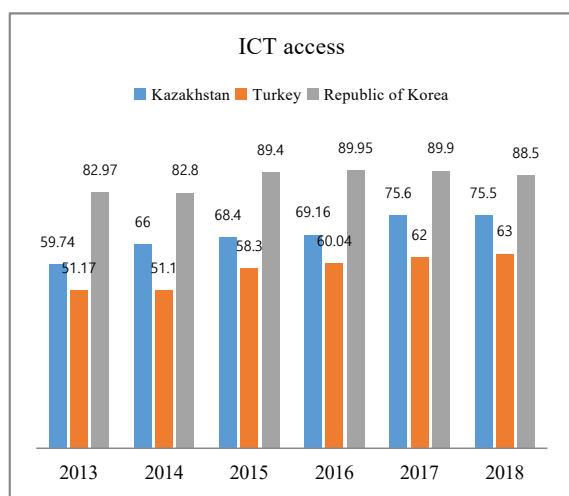
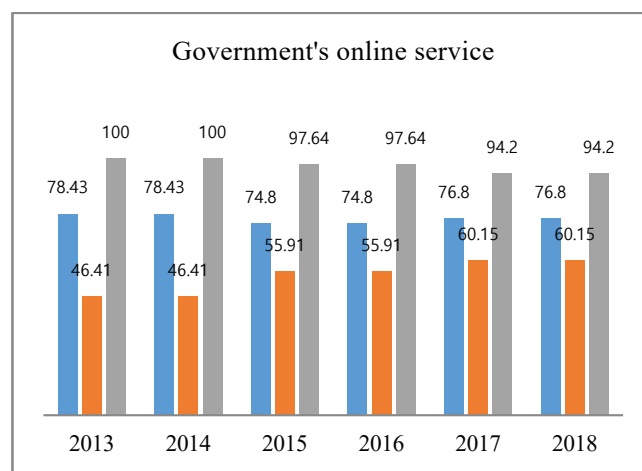
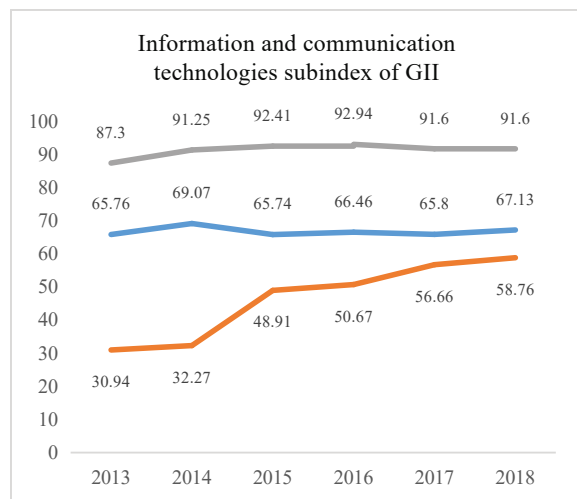
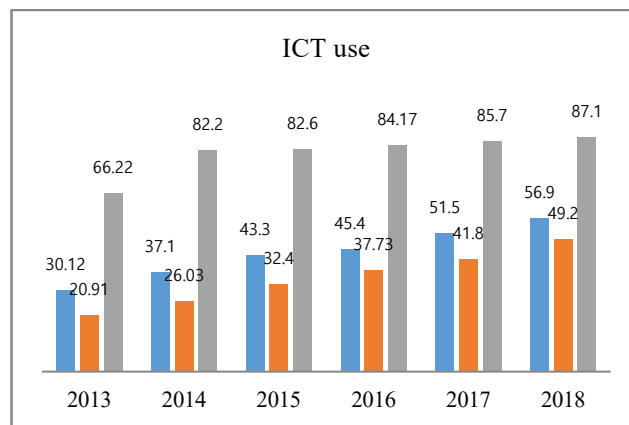
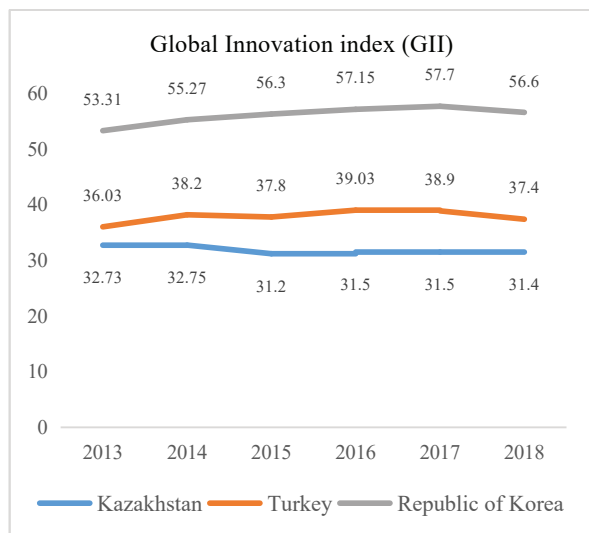


Figure 4: Dynamics of the ICT sub-index in the ranking of the Global Innovation Index for 2013-2018

out in e-commerce (wholesaling and retailing) not hardware or software production. E-commerce share of total retail reached 1.4 percent, growth in the number of online retail orders made up 56.8%.

Net export of ICT sector is declining due to growing the import. That is reasoned by the growing localization of the ICT industry. This causes growing needs for ICT specialists.

Kazakhstan performs well on the international arena. The country's IDI has grown two-fold during 2013-2017 compared to Turkey and 14 times compared to Korea. In particular, Access and Use sub-indices are higher than in Turkey and much lower than in Korea. As a result of the state programs the share of Internet users increased to 81.3 percent, digital literacy rate of the population reached 79.6 percent, penetration rate of home broadband Internet networks reached 83.9 percent.

At the same time, Turkey is doing well in Skills area. Kazakhstan has significant room for improvement in this sphere. According to ICT sub index of GII Kazakhstan's position is steadily declining, whereas, Turkey made a significant two-fold jump. This is due to the deterioration of "Online Government Services" and "E-Participation" indicators.

5. Conclusions

The development of Information and Communication Technologies is an important issue that affects countries' socioeconomic prosperity, and the majority of studies indicate that the effect of ICT is quite significant. However, a few studies are dedicated to research barriers and enablers of the digital development.

This research findings show that despite great efforts in digitalization, the ICT industry contribution to Kazakhstan's economy does not increase, it even falls. The fastest-growing sector of the ICT industry is e-commerce.

According to the international rankings the country has been doing its best in Access and Use areas that is reflected in going up in the IDI ranking. But the weakness of the country here is in Skills area. One of the aims of the state program "Digital Kazakhstan", approved in 2017, is the development of human capital and creating an innovation ecosystem. It is expected that the program will contribute to structural changes by expanding the national technological potential, the startup industry and other non-resource sectors in the economy (Sputnik, 2019).

The global digital divide can be explained by economic, regulatory and sociopolitical characteristics of countries and their evolution over time (Guillén & Suárez, 2005). The income, education, and infrastructure play a critical role in shaping the divide (Quibria et al., 2003). Kazakhstan is performing rather well on building ICT infrastructure. One of the challenges for Kazakhstan education system

is training more qualified IT and other specialists for ICT industry as well as building a favorable environment to retain highly qualified ICT specialists locally. It is advisable to learn experience from Turkey and Korea in those issues. It is recognized that Turkey and Korea achieved good results in ICT employment.

Trade protectionism, state inefficiency in the development of a favorable environment, lack of innovation and uneven technological development due to uneven human capital are considered to be the main barriers to digitalization on a global scale (WEF, 2017).

An analysis of the position of Kazakhstan in the Global Innovation Index shows that innovation performance can be improved in many directions. The country has low indicators in Venture capital deals (75th rank), GDP per unit of energy use (109), and Innovation linkages (118). But Kazakhstan is weak mostly on the innovation output side of the GII - the Knowledge and technology outputs (81) and Creative outputs (102).

However, Kazakhstan has favorable conditions for doing business. The position of Kazakhstan in Business environment, Ease of starting a business, Ease of resolving insolvency indicators are quite high (31, 33, 34 ranks, respectively). In Ease of protecting minority investors Kazakhstan takes the top spot in the world. As a result FDI inflows are highly ranked indicator as well (22nd rank).

According to the international research company IDC, 40% of the leading companies can be pushed out of the market by newcomers, who from the very beginning embarked on the digital path. In this regard, organizations should formulate strategies and plans for retraining employees. Considering that the speed of digital transformation relative to previous technological revolutions is high, the response of enterprises must be accelerated. For governments, the problem is also relevant. Potential inequalities and wage deflation or even social unrest require urgent action to prepare the workforce for a digital future (WEF, 2016).

In this regard, the government of Kazakhstan has accepted the challenge of digitalization and is faced with serious challenges to increase the innovative activity of enterprises. It is obvious that the main factors in achieving this goal are highly competitive environment, highly qualified human capital, accelerated development of the information and communications technology industry along with developed ICT infrastructure.

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