

Comparative Analysis of Strategies and Trends Shaping The Information Economy of Azerbaijan with Leading Countries

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Abstract: Here is information economy development trends in leading foreign countries are analyzed. Formation of information economy experience has been summarized in the case of the U.S., South Korea, China, Ireland and so on. Has been reviewed comparative analysis of strategies and trends shaping the information economy of Azerbaijan with developed countries. Given a number of recommendations put forward for future development.

Keywords: *information economy, ICT and e-services, "E-state, high-tech park, e-commerce*

I. INTRODUCTION

In recent years, developed countries make rapid transition into the new type of economy based on modern ICT technologies, information and knowledge. Transition into the new economy is characterized with changing in the nature of traditional productions areas, shifting the information into the major production resource, and economic system to be the main development factor.

It has been globally recognized that the economic health of a nation is increasingly tied to its development of a sustainable information economy. And the information economy is characterized with changing in the nature of traditional productions areas, shifting the information into the major production resource, and economic system to be the main development factor. During the final decades of the twentieth century, developed countries invested heavily in information and communications technology (ICT) to maintain their competitiveness in the global information economy and emerging economies are pursuing a similar path of economic development through enhancement of their ICT sectors and promotion of ICT adoption in other sectors.

A strong linkage between the production and use of ICT and the development of a sustainable information economy, ICT contributes to economic growth of emerging economies. Hence, a sustainable information economy depends upon both the production of ICT goods and services and the diffusion and use of ICT in other sectors such as agriculture, manufacturing, education and public sectors. At present, a new economy is being formed in Azerbaijan, which is based on information, knowledge, and modern technologies. The development information and communication technologies, and transition to Information society, expanded use of ICT and e-services at the state and local governmental bodies, meeting information the needs of society for information products and services, and the training of scientific human resources and other qualified professionals, and etc. are of prior tasks of the Development Concept of the country by 2020 [1]. Depending on the development characteristics of the countries there exist some definite differences and problems in the formation and the development of the economy. Therefore, the USA, the Eu-

ropean Union countries, as well as developed countries such as Japan, and the developing countries such as China, India, South Korea and etc. study current development trends of the formation of information society and economy and conduct researches for its successful implementation.

II. FORMATION OF INFORMATION ECONOMY IN AZERBAIJAN

Taking into account the characteristics of the country for current period, the national development model is adapted to analyzed development trends of advanced countries.

Azerbaijan is one of the emerging economies in Europe and Central Asia, a region that has experienced substantial economic growth during the last decade. In its effort to develop a sustainable information economy, Azerbaijan has been actively seeking ways to develop its ICT sector, attract foreign investment, foster domestic entrepreneurship, and raise its competitive position. ICT sector in the country was declared a priority in recent years, and many large-scale projects are implemented in this regard. That is why, according to some development indicators, Azerbaijan left behind some leading countries. "The Global Information Technology Report 2014", developed by the World Economic Forum, rated Azerbaijan 49th among 148 countries for its "Networked Readiness Index", which reflects the development of the countries in the field of information technology [3]. Azerbaijan was rated 56th last year. According to this table, Azerbaijan left behind even some leading countries. It maintains its leading position in the CIS, being rated 59th for the number of Internet users per 100 people out of 148 countries, and 46th for the number of broadband Internet subscribers. In addition, due to the innovative ability of the companies, Azerbaijan rated 35th in the world, and 1st among CIS.

Currently, there are about 1 million Internet users in Azerbaijan. 50% of which is broadband users.

Recently, ICT sector has become leading and dynamically developing area of the economy. Over the years, investment to the industry amounted approximately \$ 2.5 billion.

Mobile network has been expanded. 4G technology was introduced in the country since 2012. There are 110 mobile subscribers per 100 people in the country. Internet channel capacity increased by 12.9 times in last five years, and reached 200 Gbit/s, and the size of the Internet services market increased about 4 times [4].

On February 8, 2013, the first telecommunication satellite of the Republic of Azerbaijan "Azerspace-1" was launched on the orbit, which is the highest technical achievement of the country since its independence. Commercial exploitation of the satellite started, which is capable to provide Europe, Middle East, Central Asia and African countries with telecommunication, Internet, television and radio broadcasting services.

"Electronic-State" project is carried out in the country successfully, the use of electronic signatures is expanded. "E-state" portal (www.e-gov.az) was launched in order to provide information exchange among information systems of government agencies, and to ensure e- services through "single-window" principle. 179 electronic services submitted by 30 state agencies are available for the users. At the same time, service centers "ASAN Xidmat" (EASY service) are organized to provide comfortable and higher quality services to citizens from single location, with the use of modern innovations, which is highly appreciated by many international organizations and universities, and became the brand of Azerbaijan.

High-specialized human resources are trained in ICT to expand national capacity. State Fund for Development of Information Technology and "High-Tech Park" have been established in the country to provide developed and competitive innovative ICT industry with high export potential [2]. These new bodies will contribute to strengthening economy of the republic of Azerbaijan, attracting foreign investment and expanding ICT products, and so on.

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III. THE INFORMATION ECONOMY AND ICT DEVELOPMENT TENDENCIES OF VARIOUS COUNTRIES

The U.S. is a leader in the field of formation of information economy. The U.S. developed comprehensive, multi-level system of national innovation in this area, which can be even regarded as the world standard. The U.S. carried out its implementations in the fields of science and innovation, education, the development of ICT, risk financing, the development of the information economy, which meets requirements of the legal framework, as well as a variety of related activities [5].

Due to the tax regulation mechanisms of American tax policy, the U.S. investment in informatics tools increased by 4 times each decade, and the labor productivity averagely by 2.1 %.

28 % of all research and experimental-design work in the U.S. (R&D) are conducted with financial support of the state. Significant role of the state in the formation of information market is associated with a high capital-intensive of the whole software and innovation activity.

The state support for newly established enterprises includes reducing state barriers, ensuring their access to credit resources, preferential tax for small and medium businesses. First of all, American experience in the information and telecommunication industry should be especially noted in the field of antitrust regulation. Investment of billions of dollars in R&D sphere is strongly influenced by the state monopoly policy.

According to the scale of costs of R&D, logistics and human resources in recent decades, United States left behind all other countries. In 2011, the total costs incurred by the US to R&D amounted \$ 499 billion (3.7% of GDP). This amounts approximately 42% of total cost of research and development

of Organization for Economic Cooperation and Development (OECD) member countries [10].

Scientific and technical potential of the U.S. is concentrated higher in some states - California, Michigan, Massachusetts, Pennsylvania.

Israeli high-tech revolutions is the basis of the country's economic development. Breakthrough in the field of high-tech in the country was due to the massive import of "human capital". An impact on the world high-tech products market is the characteristic of the Israeli economy

The Israeli government adopted a package of new programs to promote technological innovation. Under the programs, the government-owned insurance company provided investment funds at risk with investment guarantees up to 70% of their initial capital. Thus, the high-tech exports increased by \$ 21 billion in 2011. At the same time, the share of high-tech products in total exports (up to 57% in 2011) increased significantly [10].

Japan Basic Law on the information society came into force in January 2001. According to this law, the state program "e-Japan", which provided conversion of the country into the world's leading information state, was implemented [8]. The program particularly focused on investing funds in the creation of networks with high bandwidth applications, R&D, the use of the Internet at the state enterprises, training of more professional human resources, and etc.

In early XXI century, international competitiveness of Japan is associated with the development of the Internet and overall economic liberalization. The new methods were adopted for GDP measurement, which benefits from software, new technology, services, healthcare, infrastructure and other advantages more precisely.

The Republic of Korea established its national policy for science and technology according to the "general innovation" program. The national innovation system was expected to be the most important factor for the development of national economy of the country. The development of information areas, such as production of special displays for digital information transmission, intelligent robots, digital contents and etc. have become priority of the national economy.

Success of South Korea in this field is due to the publicity of telecommunications market. Long-term development strategy of the telecommunications market is to provide high-speed Internet access. Antitrust policy of South Korea contributes to the development of video-information transmission technologies via Internet [10]. This, in its turn, contributes to the competitive advantages of South Korean manufacturers in the field of mobile devices provided with Internet access.

In 2006, the share of the R&D expenses amounted 1.8% of GDP of People's Republic of China. 40% of investment to R&D was provided by the state, and 60 % by domestic and foreign private firms. In 2003, China rated 3rd country in the world for the amount allocated to research and experimental-design projects. According to this indicator Chinese lagged behind the U.S. and Japan. China distinguishes for its highly developed Internet, and it is supported and controlled by the

state directly. Including the Internet, information technology, first of all, is developed to present China's export products to the world market [8].

The Chinese government supports distribution of Internet technologies in most advanced areas of industry, in order to improve the management quality and competitiveness efficiency.

India has made significant progress in the development of the information economy. Approximately 4 million people in the country are engaged in the spheres of service, and 340 thousand in computer companies. IT industry of India is specialized in the field of outsourcing and offshore programming [5]. Offshore programming development is fully supported by the government; India increases its budget for training human resources, R&D and e-commerce to develop information economy. India is considered to be sufficiently serious competitor for Central and Eastern European countries specialized in the field of offshore programming, as well as Russia.

In the EU countries (Sweden, Finland, Norway, Ireland, UK) implemented a successful model that combines a high level of human capital, innovation and in information and telecommunications infrastructure. Market economies are characterized by a significant influence of the state on the market mechanism and a strong system of social provision.

India, South Korea, China, Thailand had some success in improving the educational potential of the country, qualification of the officials that was the impetus for the development of knowledge-based industries in these countries. Moreover, these countries have been able to go with their goods and services to the global information technology market. At the same time the standard of living here is pretty low, on the order below the standard of living in Singapore or Taiwan [6].

In these countries the low domestic demand for high-tech products, and hence the level of development of information and telecommunications infrastructure. High qualification and low wages specialists form concurrently advantages of these countries.

The analysis of development tendencies of various countries in the formation and development of information economy showed, that ICT infrastructure, national innovation system, the development of scientific and service industries, the export of high-tech products, higher potential of education, high-level specialized human resources, and etc. are the key factors in the formation and development of information economy (Table 1).

IV. THE COMPARATIVE ANALYSIS OF DEVELOPMENT TENDENCIES OF VARIOUS COUNTRIES

Although there is no one-size-fits-all path of information economy development, we argue that there are some general themes that are fundamentally important for developing a sustainable information economy in any context.

Next, we compare the case of Azerbaijan with that of South Korea, Ireland, India and China in order to gain perspectives on the opportunities and challenges facing Azerbaijan as it competes in the global market. Ireland's success in

leapfrogging from a traditional agrarian economy to an information economy has been largely attributed to the development and maturation of the Irish ICT sector. Hence, drawing on the experience of Ireland provides rich insights for analyzing Azerbaijan's path. China, India, South Korea, Singapore, Thailand and etc. are among the fastest growing economies in Asia and are at similar stages of economic development yet show clear divergence with respect to their ICT sectors [7]. Thus, these countries provide additional perspectives regarding viable paths available to nations for building their information economies.

TABLE 1. INFORMATION ECONOMY AND ICT DEVELOPMENT TRENDS

Country or country groups	Development directions	Development trends of ICT industry
The USA	Computer hardware and software industry NIS	ICT infrastructure, export of hi-tech products and services, human resources and financial support for R&D, tax incentives, antitrust policy, etc.
Asia-Pacific countries	Computer hardware and software industry	Human resources, R & D investment, and government regulation
Finland, Israel, Singapore	IT industry	Technology infrastructure, R&D, firm strategies, and capital availability
China, India, Ireland, Israel, Russia	Software industry	International and domestic demands, national policies, a skilled workforce, technological infrastructure, financial incentives, and R&D investment
South Korea	NIS Electronic industry	export of hi-tech products and services, higher education capacity, human resources, development industries
Japan	NIS IT industry	higher education capacity, ICT infrastructure, development of the industry, investment for the R & D and human resources, etc.
Azerbaijan	NIS IT industry	ICT infrastructure, investment for the R & D and human resources, national policies

The results suggest that although Azerbaijan appears to be on a positive trajectory toward a sustainable information economy, areas remain that require improvement if economic development is to continue. Azerbaijan needs coherent economic, taxation, trade, ICT, and human capital policies in order to facilitate the development of a sustainable information economy.

Infrastructural challenges include uneven physical infrastructure development across regions, and human infrastructure issues in the form of a skilled workforce that is too small, and low R&D expenditures in the ICT sector. Future economic growth of Azerbaijan will depend on an increase in investments and improvement in technology and innovation.

A well developed infrastructure is very important to facilitating the work in the ICT sector. Ireland is in the leading po-

sition with respect to infrastructure development because of its early start, the strong support from the Irish government, and the active involvement of the private sector. The indicators also show that China is far more advanced than India with respect to ICT diffusion and infrastructure development. However, China and India are at a similar developmental stage and carry similar developmental burdens such as a large population and regionally-skewed development. The advancement of China in terms of infrastructure development can be attributed to a considerable amount of investment, nationwide developmental strategy, strong interventions and controls of the central government [7].

In India, on the other hand, despite its domination in the global ICT services export market, the service industry is heavily concentrated around major clusters including Bangalore, Mumbai, Chennai, Delhi and Hyderabad.

In these clusters, the infrastructure has been developed to facilitate ICT sector work. However, for the rest of India, the infrastructure in many rural areas is inadequately developed, thereby lowering the national average indicators and posing as a barrier to future growth.

As discussed in the previous section, Azerbaijan has made steady progress towards infrastructure development. As a late-comer participant in the global ICT market, Azerbaijan can learn some valuable lessons: continuously investing in ICT infrastructure, involving both public and private sectors in development activities, focusing greater effort on establishing a strong technical and human infrastructure (education and R&D expenditure), and promoting balanced nationwide ICT development. One common lesson learned from the ICT sector and information economy development in many different countries is the criticality of ensuring the supply of a qualified knowledge workforce. The education was also made essentially free in Ireland, something that ensures the supply of a skilled workforce.

In addition to the government support, another unique aspect of the Irish software sector development is the close linkage between the academic institutions and industry. There are many similarities between China and India in terms of the supply of skilled workers. Building on the large population base in both nations, both countries are facing the challenge of skill gaps. The lack of English-speaking proficiency in the ICT workforce is considered one of the biggest disadvantages of China in competing with India in the global ICT offshore outsourcing market.

In addition to reforming the education curriculum and improving the education quality, one of the strategies that both nations can leverage is the reverse brain-drain. Each year, a large number of Chinese and Indian college students come to the U.S. and other developed countries to pursue advanced degrees and careers. Therefore, it is important for India and China to turn the brain-drain into a brain-gain, by providing incentives and opportunities that encourage returning, and that cultivate the great potential of such mobile human capital.

The challenges China and India are currently facing in workforce supply are valuable lessons for Azerbaijan. And

Azerbaijan needs to improve the quality and quantity of IT workers to support the growth and value-added contribution of its IT industry.

Therefore, it is very important for Azerbaijan to carefully evaluate the global market trend and its distinctive characteristics to define its own developmental path.

CONCLUSION

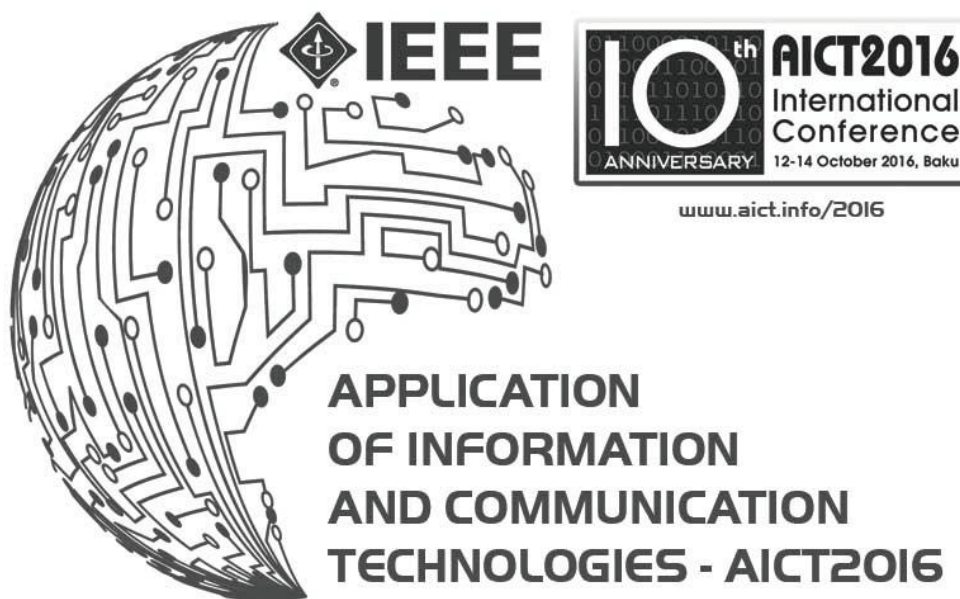
The studies prove, that establishing efficient information infrastructure based on free and healthy competition of telecommunication market, the development of ICT sector, including the high-tech sector and the services, investing to R&D and high-tech institutions, expansion of the export of high-tech products, computer literacy of the population, availability of efficient and secure information exchange, training of human resources, government support and the legal and regulatory framework are of great importance for the formation and development of information economy.

Research has also shown that there is no "one best model" for information economy development. Further, globalization requires that the development of a nation's information economy must be closely connected to the global market, as the cases of China, India, Ireland, Singapore, and Taiwan show.

Current development rate of the country, taking into account its features, benefiting from the experience of the advanced countries, information society and economy can be certainly formed and developed in Azerbaijan.

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