PRACE NAUKOWE
Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS
of Wrocław University of Economics

Redefinition of the Role of Asia-Pacific Region in the Global Economy

edited by
Bogusława Drelich-Skulska
Anna H. Jankowiak
Szymon Mazurek

Contents

Part 3. The challenges for the Chinese economy in the 21st century

Streszczenia

Część 1. Współczesne trendy i perspektywy w polityce ekonomicznej regionu Azji i Pacyfiku

Część 2. Perspektywy handlu, inwestycji i finansów w regionie Azji i Pacyfiku

Część 3. Wyzwania dla gospodarki Chin w XXI wieku

Joanna Kos-Łabędowicz, Sylwia Talar
University of Economics in Katowice
e-mails: {joanna.kos; sylwia.talar}@ue.katowice.pl

SOUTH KOREA MODEL OF DEVELOPMENT OF INTERNET ECONOMY INFRASTRUCTURE

Abstract: A well-developed Internet infrastructure is crucial for taking advantage of opportunities that ubiquitous and steadily growing Internet access gives to economy. The goal of this paper is to analyse and evaluate the degree of development of Korean Internet infrastructure, Korea Internet usage, and singling out most important factors that contribute to Korean success in this area. Described solutions are also applicable in other countries. Determined execution of strategies laid down in 1980s led to increased utilization of information communication technologies and recognizing them as critical factor in economic growth and factor in increase of competitiveness of Korean economy.

Keywords: South Korea, Internet infrastructure, informatization strategy.

DOI: 10.15611/pn.2014.370.07

1. Introduction

South Korea, called Korea in further parts of this paper, has once more drawn attention of the world with its achievements in its social and economic development. Determined and consistent actions, significant national interventionism and long--term planning are visible and consistent hallmarks of Korea's policy. At present, Korean economy is transiting towards knowledge-based economy, named "creative economy" in most recent – announced in 2013 – government plan.[1] But even now, Korea is truly unrivalled in many areas, especially in those relating to innovations and those that form its base infrastructure. Of course, it does not mean that Korea's position is not threatened. Development strategy for several next years[2] confirms that

---

[1] S. Connell, *Building a Creative Economy in South Korea: Analyzing the Plans and Possibilities for New Economic Growth*, Academic Paper Series, 2013, December 10, Korea Economic Institute of America, Washington, DC, 2013, http://www.keia.org/publication/building-creative-economy-south-korea-analyzing-plans-and-possibilities-new-economic-gro (retrieved: 15.04.2014).

[2] G. Park, *Address to the Nation by President Park Geun-hye on the Three-year Plan for Economic Innovation*, 2014, February 25, http://www.korea.net/pdfcontent/news/Address_to_the_Nation-3-yr_Planfor_Economi.pdf (retrieved: 15.04.2014).

Korea does not reduce and certainly does not stop to exercise efforts towards further innovative development.

Degree of development of the Internet infrastructure should be considered one of the greatest successes of Korea. A well-developed Internet infrastructure is crucial for taking advantage of opportunities that ubiquitous and steadily growing Internet access gives to economy. Internet simplifies, decreases costs and speeds up numerous innovations. It is also an innovation by itself, an innovation with significant growth potential and development of associated technologies. The Internet is also a general-purpose technology, one of great importance for entire economy, especially in a high-developed country. Because of this fact, along with steadily growing size of Internet economy (an economy created by Internet and using it in its daily operations), the case of Korea was chosen as an example of a country that has noticeable achievements in the area of building up infrastructural foundation of its Internet economy. The goal of this paper is to analyse and evaluate the degree of development of Korean Internet infrastructure, Korea Internet usage, and singling out most important factors that contribute to Korean success in this area. Described solutions are also applicable in other countries. In order to fulfil this goal, the author conducted a ratio analysis based on data from international organizations and Internet platforms that collect information on Internet economy and information society. Additionally, a wide literature study was conducted, resulting in analysis and synthesis that lead to final conclusions.

2. Quality of the Internet infrastructure

Widespread use of Internet and development of Internet access technology created the need for research and analytic work that would give a picture of infrastructure development, along with the degree and way it is used. In response to this demand, data collection on this subject was undertaken, along with methodology development and creation of synthetic measurement tools. There are currently numerous indicators, tools and sources from which authors have chosen those most recent and, at the same time, those that allow for analysing Korean Internet infrastructure development in regard to both quality and quantity. The analysis is conducted in comparison to other most developed countries.

Korea's position in Internet infrastructure development rankings is mainly defined by average connection speed indicator. According to data from Akamai (Table 1), by the end of 2013, the average connection speed in Korea was 21.9 Mbps. This value was significantly higher than in any other country on the list; differences between the remaining countries were far smaller.[3] Korean domination in this regard has been noticeable for many years, as shown by data from 2007.

---

[3] Decisive advantage of Korea over other countries in regard of average connection speed is show in Ookla platform *OECD Communications Outlook 2013*, OECD Publishing, Paris 2013, p. 110, and

Table 1. Ten countries with best Average Connection Speed in 4th quarter of 2013, compared to results in 2007 (values in Mbps)

Average connection speed for all connections (Mbps)			Average peak connection speed (Mbps)		
Country	Q4 2013	Q4 2007	Country	Q4 2013	Q4 2007
South Korea	21.9	10.1	Hong Kong	68.0	18.2
Japan	12.8	7.3	South Korea	64.4	23.3
Netherlands	12.2	4.2	Singapore	59.1	6.9
Hong Kong	12.2	6.1	Israel	54.6	6.9
Switzerland	12.0	4.4	Japan	53.7	16.7
Czech Republic	11.4	4.0	Taiwan	50.9	7.8
Sweden	10.5	4.5	Romania	50.6	7.8
Latvia	10.4	3.3	Latvia	48.8	8.5
Ireland	10.4	2.8	Switzerland	44.2	10.1
USA	10.0	4.0	USA	43.7	10.8

Source: *Akamai's State of the Internet. Q4 2013 Report*, vol. 6, no. 4, p. 17, http://www.akamai.com/dl/
　　　akamai/akamai-soti-a4-q413.pdf?WT.mc_id=soti_a4_Q413 (retrieved: 30.04.2014); archive
　　　data for 2007 taken from: http://www.akamai.com/stateoftheinternet/soti-visualizations.htm-
　　　l#stoi-graph (retrieved: 30.04.2014).

Besides average connection speed indicator for all Internet connections, there is another important indicator – an average peak connection speed, measured by recording top speed for every unique IP address.[4] In this regard, Korea had the top position in 2007, but lost it in 2013 to Hong Kong which achieved 68 Mbps, surpassing Korea's result of 64.4 Mbps (Table 1). Nonetheless, differences between countries are not large, thus it is reasonable to treat Korea as one of the world top countries in this regard despite its second place. Another factor contributing to this approach is the high broadband (> 10 Mbps) connectivity rate, measuring percentage of connections with speed above 10 Mbps in total number of connections. In Akamai report, in last quarter of 2013, this indicator has reached value of 71% for Korea, in comparison to next best Japan, with value of 47%.[5]

CISCO data as well, *VNI Forecast Highlights*, 2014, http://www.cisco.com/web/solutions/sp/vni/vni_
forecast_highlights/index.html (retrieved: 20.04.2014).

　[4] Explanation and interpretation of metrics from *State of the Internet* report can be found on: https://
blogs.akamai.com/2013/04/clarifying-state-of-the-internet-report-metrics.html (retrieved: 30.04.2014).

　[5] *Akamai's State…*, p. 18. Compare to ITU data, according to which percentage of fixed (wired) broadband subscriptions offer speeds above 10 Mbps reached in 2012 nearly 100% in Korea, which was the world top result, *Measuring the Information Society 2013*, International Telecommunication Union, Geneva 2013, https://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2013/MIS2013_
without_Annex_4.pdf.

High-speed of Internet connections is a result of using advanced technology for both stationary and mobile Internet access. Korea has one of the highest fiber-optic penetration ratios in the world, indicating a widespread high-speed wired Internet access infrastructure. According to OECD data from middle 2013, 62.8% of wired broadband connections in Korea were done by the way of fiber-optic cables, while in Japan the measured percentage was 68.5%. Third place, with a noticeable difference from two top places, falls to Sweden, with the result of 35.9%.[6] Nonetheless, at the same time, Korea had the highest number of wired broadband subscriptions in fiber technology per 100 inhabitants – 23.3 – compared to Japan's 19.1.

Korea's advantage is specifically visible in development and availability of mobile Internet access. By the end of 2013, more that 50% of all mobile connections were made in LTE technology, compared to ca. 20% in Japan and USA, and mere 2% in the European Union.[7] It might be an interesting fact that Korea was not the first country to introduce LTE technology for public use – it was first deployed in Norway and Sweden in 2009, followed by USA, Japan, Germany, and Uzbekistan. Korea introduced LTE only in 2011.[8] Despite the delay, Korea managed to achieve the world best availability of the technology.[9]

Internet technology progresses at an extremely fast pace. This results in equally fast change of associated indicators that measure quality of infrastructure. Korea has been maintaining a significant advantage in both quality and accessibility of Internet infrastructure for many years, and clearly intends to remain a world leader in this field. In the middle of 2013, Korean operator SK Telecom has deployed the first publicly available LTE-Advanced (LTE-A) network. This technology allowed for doubling the bandwidth (up to 150 Mbps) compared to LTE. The operator has stated that they are developing the technology in order to achieve speed of 500 Mbps before the end of 2015. At the same time, USA operators like AT&T and Verizon, have announced the intent and plans to introduce LTE-A technology.[10] Of course, actually achieving the speed promised by LTE-A requires the end-user to use devices

---

[6] Data from: *Key ICT indicators: Broadband subscriptions per 100 inhabitants in OECD countries*, OECD, 2013, Excel file 4a, updated: July 2013, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 30.04.2014), compared to: S. Shankland, *Fast fiber-optic broadband spreads across developed world*, 2014, January 11, http://www.cnet.com/news/fast-fiber-optic-broadband-spreads-across-developed-world/ (retrieved: 30.04.2014).

[7] *Delivering Digital Infrastructure. Advancing the Internet Economy*, World Economic Forum, 2014, pp. 29, 30, http://www3.weforum.org/docs/WEF_TC_DeliveringDigitalInfrastructure_InternetEconomy_Report_2014.pdf (retrieved: 12.04.2014).

[8] *Global State of LTE Report*, OpenSignal, February 2013, http://opensignal.com/reports/state-of-lte/OpenSignal-State-of-LTE-Report_%28Feb-2013%29.pdf (retrieved: 12.04.2014).

[9] Compare with new indicators for network coverage based on user's average time on LTE, *Global State of LTE Report*, OpenSignal, February 2014, http://opensignal.com/assets/pdf/reports/2014_02_opensignal-state-of-lte-report.pdf (retrieved: 12.04.2014).

[10] S. Musil, *SK Telecom launches world's first LTE-Advanced network*, 2013, June 25, http://www.cnet.com/news/sk-telecom-launches-worlds-first-lte-advanced-network/ (retrieved: 12.04.2014).

conforming to the standard and capable of utilizing the full extent of the technology. To meet this demand, Samsung has introduced world-first LTE-A capable commercial smartphone: Galaxy S4 LTE-A.[11]

Korea, in spite of numerous achievements and the world top position in Internet infrastructure quality, does not stop the efforts of continuous development. A good example of these efforts is Creative 5G Mobile Strategy – a detailed plan of financing research, development, standardization and creation of commercial infrastructure for next, fifth generation of mobile Internet (5G) before 2020. 5G is expected to be hundred times faster than currently common 4G LTE.[12] The Korean government is going to invest about 1.5 billion USD in the project as part of public-private partnership. An international rivalry for primacy and domination on the 5G market has already developed, including not only USA and China, but also the European Union with its public-private partnership investment plan of 700 million EUR as part of Horizon 2020 plan, approved in late 2013.[13] The winner of this technological race will be known in a few years.

3. Internet users

Quality of the Internet infrastructure is only one of the factors that make Korea distinct from other world countries. Another important factor is ubiquitous access to the Internet and intensity with which it is used. The percentage of Internet users in relation to total number of residents has reached 84% in 2012. This value is higher for many countries, especially European ones, but among OECD countries, Korea has the highest percentage of households with Internet access (97.4% in 2012) and is the only country in which all those connections are broadband.[14] A characteristic of Korean people is to use the Internet regardless of their current location. Korea has the highest percentage of Internet users accessing the Internet on the move among all OECD countries, reaching 50%.[15] It is doubtlessly a consequence of widely accessible high quality mobile Internet.

---

[11] *Ibidem*.

[12] Korea aims to take initiative in 5G Communications, *BusinessKorea* 2014, January 23, http://www.businesskorea.co.kr/article/3042/extensive-investment-korea-aims-take-initiative-5g (retrieved: 20.04.2014).

[13] *5G Infrastructure PPP: The next generation of communication networks will be "Made in EU"*, European Commission, 2014, http://ec.europa.eu/research/press/2013/pdf/ppp/5g_factsheet.pdf and information on: http://5g-ppp.eu/ (retrieved: 25.04.2014).

[14] *ICT Facts and Figures. The World in 2013*, International Telecommunication Union, 2013, http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2013-e.pdf, pp. 228–231 (retrieved: 2.05.2014); *Key ICT indicators: Households with access to broadband in selected OECD countries*, Excel file 6c, OECD, 2012, updated: July 2012, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 25.04.2014); *Key ICT indicators: Households with access to the Internet in selected OECD countries*, Excel file 6b, OECD, 2012, updated: July 2012, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 25.04.2014).

[15] *OECD Communications…*, p. 294.

Moreover, Korea is a country that definitely makes the most intense use of the Internet compared to any country in the world. According to data provided by CISCO, average Korean Internet user generates nearly 44 gigabytes of network traffic monthly, clearly topping the values for other highly-developed countries (Table 2). The difference grows even bigger when measured on the level of the household. The degree the Internet is used in Korea is best shown by percentage of households that generate the top traffic – more than 100 Gb, and more than 500 Gb monthly.

Table 2. Intensity of Internet usage in Korea in comparison to selected countries[*] in 2012

Item	Korea	Japan	USA	Canada	UK	Australia
Traffic generated by average Internet user (Gb/month)	43.8	11.6	0,2493	25.0	30.7	11.4
Traffic generated by average household with Internet access (Gb/month)	112.3	30.3	62.9	57.7	63.3	27.7
Percentage of households that generate more than 100 Gb per month (%)	26.8	2.3	15.1	1.8	15.4	3.0
Percentage of households that generate more than 250 Gb per month (%)	11.8	1.1	3.0	2.9	3.1	1.0
Percentage of households that generate more than 500 Gb per month (%)	3.2	0.0	1.0	1.0	1.0	0.9

[*] CISCO does not provide data for every country, therefore this table shows only the most important countries for which the data are available.

Source: *VNI Forecast…*

To show a complete picture of Internet users in Korea, their high tendency to use new technology must be mentioned. Korean people are spending the highest percentage of their alternative-needs budget – compared to other countries of the world – on ICT goods and services and this trend has continued for many years.[16]

Intensity of Internet service usage, including the demand for the Internet access itself, depends greatly on individual person's capability and competence to use the technology in an efficient and satisfying manner. As an approximate way to measure this kind of competence, ITU uses a synthetic skills sub-index that is a part of broader measurement tool – IDI (ICT Development Index) and is based on three popular indicators measuring degree of education on middle and high level and general literacy of the society. More detailed data on specific ICT skills are not available to the public. According to aforementioned sub-index, Korea places first in the world regarding skills of its people,[17] which not only makes advanced Internet infrastructure more accessible for people, but – along with high inclination of the

---

[16] Ibidem, pp. 275, 276, 304.
[17] *Measuring the Information…*, pp. 53, 54.

Korean people to buy ICT products – is a factor heavily contributing – and in face of strong competition on the market, forcing – constant and persistent technological growth in this country.

4. Sources of the success from government perspective

Korea, as one of the first countries in the world, has noticed the importance of using ICT to promote and strengthen economic growth, increase efficiency and productivity and increasing democracy.[18] Korean success is a consequence of many factors – most of them are difficult to explain, or even to point out, mainly due to numerous interconnections between them. Guiding role of the government, involvement of civil servants and significant resources devoted to finance ICT development are only few of more important factors responsible for effectiveness of Korean development strategies. In order to successfully face challenges posed by ICT and effectively take advantage of opportunities offered, it was decided to reorganize existing administrative structure. Afterwards, priorities were decided and tasks were given to newly organized administration. In 1987, a series of plans and projects started, with a goal to create an information society in Korea. Directions were laid down in following national programs and projects:[19]

- The National Basic Information System (1987–1996) – first of projects with the goal of increasing – and promoting – wider usage of computer networks;
- The Korea Information Infrastructure (KII) – a project that began in 1995 with several goals, including creation of national high-speed public backbone, development of ICT using solutions and promoting R&D and IT initiatives. KII promoted public-private partnership and took action to promote companies to increase ICT use and undertake investments connected to ICT development;
- The National Framework Plan for Informatization Promotion – a program started in 1996 with annual plans for e-government and education. This program also created Informatization Promotion Committee that was tasked with creation and evaluation if ICT projects;
- CYBER KOREA 21 (1999–2002) – a project created in response to Asian financial crisis. It laid down steps necessary to make the transition of Korean society into information society, increase productivity in ICT sector and creation of new workplaces and enterprises in order to combat economic problems;
- e-Korea Vision 2006 (2002–2006) – a plan to put Korea in position of the global leader by:[20]

---

[18] H. Lee, S. Oh, Y. Shim, *Do we need broadband? Impacts of broadband in Korea*, info, 2005, vol. 7, no. 4, http://www.emeraldinsight.com/journals.htm?articleid=1509706 (retrieved: 12.05.2014), p. 47.

[19] *Broadband Korea: Internet Case Study*, International Telecommunication Union, 2003, pp. 39, 40.

[20] *e-Korea Vision 2006. The Third Master Plan for Informatization Promotion (2002–2006)*, Ministry of Information and Communication, 2002, http://www.unapcict.org/ecohub/resources/u-korea/?-searchterm=korea (retrieved: 8.05.2014).

- maximizing the ability of all citizens to utilize ICT in order to actively participate in the information society,
- strengthening global competitiveness of the economy by promoting informatization in all industries,
- realizing a smart government structure with high transparency and productivity through informatization efforts,
- becoming a leader in the global information society by taking a major role in international cooperation;

- U-Korea Master Plan (2006–2015) – the main goal of this plan is creation of the society in which all people would be able to take advantage of safe, ubiquitous society, 4U: Universal, Usable, Unisonous, Upgraded by the way of progress in five main areas (government, land, economy, social environment, individual life), along with optimalization of four main driving forces (globalization, industrial infrastructure, social infrastructure, technological development);[21]
- National Informatization Master Plan (2008–2012) – main guidelines of this plan were: active action against negative results of informatization, adaptations to changes in policy and reaction to new demands of the society. National Informatization Action Plan, responsible for putting the master plan in motion was established in 2009. Its two main goals were: economic recovery after global financial crisis and improvement of nation's competitiveness. Additionally, plans for every area of national informatization were established. The plans were as follows:[22]
  - National Strategy for Green IT – declaring green IT products and services as new driving power of the economy,
  - Comprehensive Plan for Facilitating Cloud Computing – calling cloud-based work the new generation of Internet business model (due to reduced cost and faster service delivery),
  - Strategy for Becoming a Software Power – declaring software design as key to improvement of national and industrial competitiveness,
  - Five Future Strategies for IT Korea – a draft of future strategies and plans based on five pillars: convergence, software, staple IT, broadcasting and communication, Internet,
  - Master Plan for Establishing IP-USN (M2M) Infrastructure – efficient application of broadcasting and communication technologies in support of

---

[21] *Korea Informatized progress and status overview 2007*, National Information Society Agency, 2007, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0, p. 3 (retrieved: 8.05.2014).

[22] *Informatization White Paper 2010. Republic of Korea*, National Information Society Agency, 2010, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0, pp. 10–16 (retrieved: 8.05.2014).

other national policies, e.g. promoting green growth, reacting to climate change, preventing natural disasters.

Policy of developing cutting-edge Internet infrastructure is not a separate and single policy, but a component of far broader strategy and is supposed to be a long--term plan to stimulate economic growth, improve international position of Korea and develop an information society. The purpose of plans made in 1982–2006 was mainly to promote informatization of Korean economy. Since 2006, the priorities have changed noticeably, and far greater emphasis was laid on building the information society. Currently, the process of informatization of Korea is in the hands of several institutions:[23]

- Presidential Council on Information Society (CIS),
- Ministry of Public Administration and Security (MOPAS),
- Ministry of Knowledge Economy (MKE),
- Korea Communications Commission (KCC),
- National Information Society Agency (NIA),
- Korea Internet & Security Agency (KISA),
- National IT Industry Promotion Agency (NIPA),
- Korea Creative Content Agency (KOCCA).

The most important characteristic of policy instituted by Korean government in area of information society is the integrated approach that is best visible in simultaneous stimulation of both supply and demand. The government instituted initiatives that increase skills of Korean people regarding access to the Internet and at the same time, promoted IT investments of the private sector.

Liberalization of the Korean telecommunication market – a part of the chosen competitive strategy – was gradual. In the nineties, the liberalization began by privatizing hitherto entirely state owned Korea Telecommunications Authority (KTA). The next step was opening the market for foreign competition,[24] followed by stimulating competition between operators. Lack of regulations regarding prices and lack of licensing led to decrease in service prices and efficient application of used technological solution.[25] Lower Internet access costs led to increase in demand.

In the process of introducing more integrated approach to ICT sector responsibility for most branches of information services and software was shifted from Ministry of Trade, Industry and Energy to enhanced Ministry of Information and Communication. This step made introduction of more elastic regulatory policies possible – one that could be easily adapted to changing market conditions. Informatization projects for enterprises

---

[23] *Korea Informatized progress and status overview 2010*, National Information Society Agency, 2010, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0, p. 7 (retrieved: 8.05.2014).

[24] J.F. Larson, *The Telecommunications Revolution in Korea*, Oxford University Press, Oxford, New York 1995, pp. 231, 232.

[25] G. Cimochowski, F. Hutten-Czapski, M. Rał, W. Sass, *Polska internetowa*, Boston Consulting Group, 2011, p. 22, http://www.bcg.com.pl/documents/file78280.pdf (retrieved: 9.05.2014).

were continued, on the one hand making access to needed information easier, on the other – encouraging them to intensify their own efforts in introducing ICT.[26]

One of main reasons for high effectiveness of undertaken activities is the manner in which they are financed. Since the beginning of the entire process, government did not work alone – it cooperated with local companies, including them heavily in the process of developing new technologies and promoting public-private partnership model in financing investments in infrastructure and Internet economy. Coherence between actions taken by government and private sector is ensured by clear and strongly defined policy with clear priorities and goals, along with determined implementation supported by significant financial help from public sources.[27] All those activities can be considered as a clear signal showing the direction the government is heading – and a call to follow it. Growing popularity of the Internet usage (among people, enterprises and public administration) – a direct result of government activity – has become an additional incentive for private sector to commit significant resources to Internet infrastructure development. In the years 1995–2005 alone, 900 million USD of public money invested in Internet infrastructure was followed by 32 billion USD of private investments.[28]

Cooperation between the government and private sector is a fact not only in financing the investments, but in institutional cooperation as well. A visible and notable example is a model applied in 1980s by research and development project of TDX (digital switching technology). This model was successfully repeated in several variations in other projects. The model consisted of:[29]

- National research institute, financed from public resources (ETRI – Electronic and Telecommunications Research Institute), tasked with developing the technology,
- Private Korean industrial enterprises (e.g. Samsung) that provided the goods based on newly developed technology,
- Purchaser of the goods (customer), in this case – national operator Korea Telekom.

The government's role was to finance the technology development and ensure initial internal demand. Long-term goal was to achieve success on foreign markets.

Noticeable factors in the entire process Korea is undergoing are the investments made towards education process – both in general and in specific Internet competence. Examples of such investments are: 10 million people Internet education project, providing Internet infrastructure for schools in 1996–2000, creation of

---

[26] W. Choi, *Industrial information programs in Korea: an overview*, Interlending & Document Supply 2007, 35/2, www.emeraldinsight.com/0264-1615.htm, p. 61 (retrieved: 12.05.2014).

[27] *Digital Society Development of Korea*, Ministry of Security and Public Administration, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611231975&id=9376&now-page=1&Order=303&search_target=&keyword=&Flag=&objpage=0, p. 15 (retrieved: 9.05.2014).

[28] G. Cimochowski et al., *op.cit.*, p. 22.

[29] J.F. Larson, *op.cit.*, pp. 181–186.

EBS – Education Broadcasting System – a system that provides educational broadcasts on an Internet platform.[30] Another facet of educational system that is worth mentioning is the heavily international nature of education process – mainly due to close relations with the USA; there are numerous scholarships, trainings, foreign studies programs. People educated abroad have had great influence in Korea: they created new faculties, introduced new industries and led important development projects. Still, new initiatives are started regularly, with the goal of increasing people's abilities, encouraging innovation and promotion of R&D. Few of current Internet competence, digital textbooks, and e-learning initiatives are presented below:[31]

- SMART Education Research Development & Policy Advancements,
- Digital Textbook Development Support and Application,
- Operation of Education Information Sharing and Distribution (EDUNET & Cyber Learning System),
- Operation of the Academic Research Information Sharing Service (RISS),
- Support for Joint-Use of Domestic and International Research Information,
- Upgrading the National Education Information System (NEIS),
- Operation of the National e-Learning Quality Management Center,
- Education Cyber Security and e-Signature Certification,
- Enhancing Global Cooperation for ICT Use in Education.

Faster Internet access, greater network accessibility and growing awareness of the people motivated the government administration to make public services available in the Internet. Government for Citizens (G4C) system integrated digital databases maintained by different public departments (e.g. resident registration, vehicle registration), which led to faster and more efficient handling of public service issues. Systems like Government e-Procurement Services (GePS) or National Finance Information System (NAFIS) make internal workings of departments easier, for instance by providing financial information in real time or making government contract offers available online. Four systems of social security (health insurance, pension insurance, industrial accident compensation insurance, unemployment insurance) were integrated as well, which led to faster decision concerning due social benefits. Current social security system in Korea is considered an example for other countries how efficient such system can be.[32]

---

[30] *Broadband Policy Development in the Republic of Korea*, A Report for Global Information and Communications Technologies Department of the World Bank, Ovum Consulting, 2009, http://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf, pp. 107, 108 (retrieved: 9.05.2014).

[31] *The 2012 KERIS Annual Report*, Korea Education and Research Information Service, 2012, http://english.keris.or.kr/es_ac/es_ac_220.jsp (retrieved: 9.05.2014).

[32] *e-Government of Korea Best Practices*, Ministry of Security and Public Administration, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611231975&id=10814&now-page=1&Order=303&search_target=&keyword=&Flag=&objpage=0 (retrieved: 9.05.2014).

The research conducted in 2011 has shown that 8 in 10 (226 755 of 263 379, exactly) enterprises with Internet access take advantage of e-Government services.[33] In response to changes in environment and growing importance of mobile technologies, a new Smart Government Strategy was established in order to provide advanced and state-of-art public services. New strategy is based on following attributes:[34]

- Seamless – integrated ministerial services and citizen-focused integrated/ customized services,
- Mobile – ubiquitous and easy access to mobile e-Government,
- Anytime – access should be possible 24/7,
- Real-time – systemic solutions making instant answers possible
- Together – increase in quality of provided services by: cooperating with business, keeping needs of increased risk groups in minds and taking advantage of citizen participation.

Increase in network speed does not only serve to increase satisfaction of its users, but also makes introduction of new mobile services possible, services that lead to innovative changes in lives of the consumers. Ubiquitous access to financial services and Internet shopping increased comfort of citizens and their quality of life, common access to the Internet and increased citizen participation in local communities creates new culture unique to growing information society. Involvement of numerous departments – ministries, public organizations, private enterprises – leads to creation and promotion of information culture. One of crucial organizations is the aforementioned NIA (National Information Society Agency), tasked with promoting computer literacy, education and training of telecommunication specialists, solving the issue of digital rift between urban and country environments, and balancing regional informatization in order to achieve coherent development.

To sum the matter up, the main factors contributing to success of Korean government's actions are:[35]

- Selection of ICT as the new engine for economic growth and main focus of investments,
- Active role of government side,
- Successful combination of government initiative and market competition,
- Consideration of supply side and demand side at the same time,
- High rate of literacy and early adoption of new technology.

---

[33] *2012 Yearbook of Information Society Statics. Republic of Korea*, Ministry of Public Administration and Security, National Information Society Agency, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=10365&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0, p. 28 (retrieved: 9.05.2014).

[34] *Digital Society…*, p. 31.

[35] K. Dongcheol, *Korean Experience of Overcoming Economic Crisis through ICT Development*, ESCAP Technical Paper, August 2009, IDD/TP-09-01, http://www.unapcict.org/ecohub/resources/korean-experience-of-overcoming-economic-crisis-through-ict-development/?searchterm=korea, p. 10 (retrieved: 8.05.2014).

5. Conclusions

Analysis of the degree of development of Korean Internet infrastructure has reached, along with the degree of Internet usage reached in Korea, leads to the following conclusions:

- Korea is the world leader in area of access to high quality (in both speed and technological advancement) Internet infrastructure, especially mobile Internet,
- not all indicators describing Internet infrastructure give Korea the world first place, but there is no country that scores better than Korea in all aspects. The top ranking of Korea is a superposition of several crucial indicators including: Internet infrastructure speed, technological advancement and common access for every citizen,
- ubiquitous access to very fast and reliable Internet connections – both fixed and mobile – results in great number of users and very high traffic generated by them,
- Internal market, especially created by people with high computer skills, who are open to ICT goods and services, is a beneficial factor in creation of infrastructure.

The task of singling out factors responsible for Korean success in developing ICT infrastructure is a very difficult one, requiring an in-depth analysis. One of important circumstances is a beneficial correlation between actions undertaken by government in 1960s and 1970s that resulted in industrialization and economic development, and demographic and cultural factors.

Determined execution of strategies laid down in 1980s led to increased utilization of information communication technologies and recognizing them as critical factor in economic growth and factor in increase of competitiveness of Korean economy. This in turn led to the current position Korea holds in regard to technology. Success of Korean government actions is a consequence of several factors, among them:

- selection of ICT as the new engine for economic growth and main focus of investments,
- determination in execution of programs and projects, while at the same time, ability to adapt to changing conditions,
- active role of the government, manifesting in the form of beneficial regulations, promotional actions and investments in ICT development,
- successful combination of government initiative and market competition, manifested in unique financing model comprised of mixture of private and public capital
- consideration of supply side and demand side at the same time,
- undertaking actions that result in increase of people's competence in using ICT and early adoption of new technology.

References

2012 Yearbook of Information Society Statics. Republic of Korea, Ministry of Public Administration and Security, National Information Society Agency, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=10365&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0 (retrieved: 9.05.2014).

5G Infrastructure PPP: The next generation of communication networks will be "Made in EU", European Commission, 2014, http://ec.europa.eu/research/press/2013/pdf/ppp/5g_factsheet.pdf and information on: http://5g-ppp.eu/ (retrieved: 25.04.2014).

Akamai's State of the Internet. Q4 2013 Report, vol. 6, no. 4, http://www.akamai.com/dl/akamai/akamai-soti-a4-q413.pdf?WT.mc_id=soti_a4_Q413 (retrieved: 30.04.2014).

Broadband Korea: Internet Case Study, International Telecommunication Union, 2003.

Broadband Policy Development in the Republic of Korea, A Report for Global Information and Communications Technologies Department of the World Bank, Ovum Consulting, 2009, http://www.infodev.org/infodev-files/resource/InfodevDocuments_934.pdf (retrieved: 9.05.2014).

Choi W., *Industrial information programs in Korea: an overview*, Interlending & Document Supply 2007, 35/2, www.emeraldinsight.com/0264-1615.htm (retrieved: 12.05.2014).

Cimochowski G., Hutten-Czapski F., Rał M., Sass W., *Polska internetowa*, Boston Consulting Group, 2011, http://www.bcg.com.pl/documents/file78280.pdf (retrieved: 9.05.2014).

Connell S., *Building a Creative Economy in South Korea: Analyzing the Plans and Possibilities for New Economic Growth*, Academic Paper Series, 2013, December 10, Korea Economic Institute of America, Washington, DC, 2013, http://www.keia.org/publication/building-creative-economy-south-korea-analyzing-plans-and-possibilities-new-economic-gro (retrieved: 15.04.2014).

Delivering Digital Infrastructure. Advancing the Internet Economy, World Economic Forum, 2014, pp. 29, 30, http://www3.weforum.org/docs/WEF_TC_DeliveringDigitalInfrastructure_InternetEconomy_Report_2014.pdf (retrieved: 12.04.2014).

Digital Society Development of Korea, Ministry of Security and Public Administration, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611231975&id=9376&nowpage=1&Order=303&search_target=&keyword=&Flag=&objpage=0 (retrieved: 9.05.2014).

Dongcheol K., *Korean Experience of Overcoming Economic Crisis through ICT Development*, ESCAP Technical Paper, August 2009, IDD/TP-09-01, http://www.unapcict.org/ecohub/resources/korean-experience-of-overcoming-economic-crisis-through-ict-development/?searchterm=korea (retrieved: 8.05.2014).

e-Government of Korea Best Practices, Ministry of Security and Public Administration, 2012, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611231975&id=10814&nowpage=1&Order=303&search_target=&keyword=&Flag=&objpage=0 (retrieved: 9.05.2014).

e-Korea Vision 2006. The Third Master Plan for Informatization Promotion (2002–2006), Ministry of Information and Communication, 2002, http://www.unapcict.org/ecohub/resources/u-korea/?-searchterm=korea (retrieved: 8.05.2014).

Global State of LTE Report, OpenSignal, February 2013, http://opensignal.com/reports/state-of-lte/OpenSignal-State-of-LTE-Report_%28Feb-2013%29.pdf (retrieved: 12.04.2014).

Global State of LTE Report, OpenSignal, February 2014, http://opensignal.com/assets/pdf/reports/2014_02_opensignal-state-of-lte-report.pdf (retrieved: 12.04.2014).

ICT Facts and Figures. The World in 2013, International Telecommunication Union, 2013, http://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2013-e.pdf (retrieved: 2.05.2014).

Informatization White Paper 2010. Republic of Korea, National Information Society Agency, 2010, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&nowpage=1&Order=301&search_target=&keyword=&Flag=&objpage=0 (retrieved: 8.05.2014).

Key ICT indicators: Broadband subscriptions per 100 inhabitants in OECD countries, OECD, 2013, Excel file 4a, updated: July 2013, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 30.04.2014).

Key ICT indicators: Households with access to broadband in selected OECD countries, Excel file 6c, OECD, 2012, updated: July 2012, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 25.04.2014).

Key ICT indicators: Households with access to the Internet in selected OECD countries, Excel file 6b, OECD, 2012, updated: July 2012, http://www.oecd.org/sti/broadband/oecdkeyictindicators.htm (retrieved: 25.04.2014).

Korea aims to take initiative in 5G Communications, *BusinessKorea* 2014, January 23, http://www.businesskorea.co.kr/article/3042/extensive-investment-korea-aims-take-initiative-5g (retrieved: 20.04.2014).

Korea Informatized progress and status overview 2007, National Information Society Agency, 2007, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&now-page=1&Order=301&search_target=&keyword=&Flag=&objpage=0 (retrieved: 8.05.2014).

Korea Informatized progress and status overview 2010, National Information Society Agency, 2010, http://eng.nia.or.kr/english/bbs/board_view.asp?BoardID=201112221611162611&id=9351&now-page=1&Order=301&search_target=&keyword=&Flag=&objpage=0 (retrieved: 8.05.2014).

Larson J.F., *The Telecommunications Revolution in Korea*, Oxford University Press, Oxford, New York 1995.

Lee H., Oh S., Shim Y., 2005, *Do we need broadband? Impacts of broadband in Korea*, info, vol. 7, no. 4, http://www.emeraldinsight.com/journals.htm?articleid=1509706 (retrieved: 12.05.2014).

Measuring the Information Society 2013, International Telecommunication Union, Geneva 2013, https://www.itu.int/en/ITU-D/Statistics/Documents/publications/mis2013/MIS2013_without_Annex_4.pdf.

Musil S., *SK Telecom launches world's first LTE-Advanced network*, 2013, June 25, http://www.cnet.com/news/sk-telecom-launches-worlds-first-lte-advanced-network/ (retrieved: 12.04.2014).

OECD Communications Outlook 2013, OECD Publishing, Paris 2013.

Park G., *Address to the Nation by President Park Geun-hye on the Three-year Plan for Economic Innovation*, February 25, 2014, http://www.korea.net/pdfcontent/news/Address_to_the_Nation--3-yr_Planfor_Economi.pdf (retrieved: 15.04.2014).

Shankland S., *Fast fiber-optic broadband spreads across developed world*, 2014, January 11, http://www.cnet.com/news/fast-fiber-optic-broadband-spreads-across-developed-world/ (retrieved: 30.04.2014).

The 2012 KERIS Annual Report, Korea Education and Research Information Service, 2012, http://english.keris.or.kr/es_ac/es_ac_220.jsp (retrieved: 9.05.2014).

VNI Forecast Highlights, 2014, http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html (retrieved: 20.04.2014).

Websites

http://www.akamai.com/stateoftheinternet/soti-visualizations.html#stoi-graph (retrieved: 30.04.2014).
https://blogs.akamai.com/2013/04/clarifying-state-of-the-internet-report-metrics.html (retrieved: 30.04.2014).

POŁUDNIOWOKOREAŃSKI MODEL ROZWOJU INFRASTRUKTURY GOSPODARKI INTERNETOWEJ

Streszczenie: Rozwinięta infrastruktura internetowa stanowi podstawowy warunek osiągania korzyści, jakie niesie dla gospodarki powszechne i coraz bardziej zaawansowane wykorzystanie możliwości globalnej sieci. Celem opracowania jest analiza i ocena stopnia rozwoju infrastruktury internetowej i wykorzystania Internetu w Korei oraz wyszczególnienie kluczowych czynników zapewniających wysoką skuteczność koreańskiej polityki w tej sferze, z założeniem możliwości wykorzystania niektórych z tych rozwiązań w innych krajach. Konsekwentna realizacja przyjętej w latach 80. XX w. strategii rozwoju zmierzającej do zwiększenia wykorzystania technologii ICT i uznanie ich za krytyczny czynnik wpływający na wzrost gospodarczy i wzrost konkurencyjności koreańskiej gospodarki przekładają się na dzisiejszą pozycję Korei jako lidera w tym obszarze.

Słowa kluczowe: Korea Południowa, infrastruktura internetowa, gospodarka internetowa.