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Conference Paper

Russian information and communication technologies, and infrastructure formation of innovation economy

24th European Regional Conference of the International Telecommunications Society (ITS):
"Technology, Investment and Uncertainty", Florence, Italy, 20th-23rd October, 2013

Provided in Cooperation with:

International Telecommunications Society (ITS)

Suggested Citation: Petukhova, Svetlana; Strepetova, Margarita (2013) : Russian information and communication technologies, and infrastructure formation of innovation economy, 24th European Regional Conference of the International Telecommunications Society (ITS): "Technology, Investment and Uncertainty", Florence, Italy, 20th-23rd October, 2013, International Telecommunications Society (ITS), Calgary

This Version is available at:

<https://hdl.handle.net/10419/88534>

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**Russian Information and Communication Technologies,
and Infrastructure Formation of Innovation Economy**

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Information and communication technologies as well as telecommunication and digital media form the sphere which, in the whole world, is liable to steady, impetuous and radical changes. International researches show a tight connection between infocommunication technologies (ICT) development and economic welfare. Large-scale expansion of high-speed communication and Internet access technologies are a catalyst of ICT projects development, it creates a multiple effect on other segments of national economy, facilitates acceleration and scaling of technological progress and, ultimately, ensures GDP growth both in separate regions and the country in general. The sector of communications and new technologies, which penetrates all areas of everyday life of people, is a most significant in terms of the degree of its impact on private and work lives, social sphere, economy, image and the country's status in the world community.

Therefore, the development of infocommunication technologies (ICT) in the RF is regarded as one of strategic directions in economy modernization; investment in telecommunication infrastructure development helps strengthen the country's long-term strategic position.

As stated in the White Book on Information Technologies, "the aim of informatization in Russia consists in creating an efficient balanced economy, which is oriented at domestic consumption and export of information technologies (IT) and services, based on principles of explicit division of responsibilities and operation of the economy on the one hand and the state on the other, of maximal use of intellectual and cadre potentials, harmonious integration in world post-industrial economy on the basis of cooperation and information openness." [1]

The main factors affecting the country's resulting Informatization Index (ICT Development/Networked Readiness) find their expression in a group of aggregates:

- ICT access, i.e. accessibility of network infrastructure, technical scope, governmental attitude to the development of information technologies, governmental spending on the development of the sector, availability of information technologies for business, level of access to Internet and other technologies, price of mobile connection, etc.;

- ICT use, i.e. readiness of citizens, business circles and governmental bodies to use ICT, level of ICT use in public, commercial and state-run sectors – the number of personal computers, Internet users, subscribers, availability of operating Internet resources used by state-run organizations as well as total production and consumption of information technologies in the country;

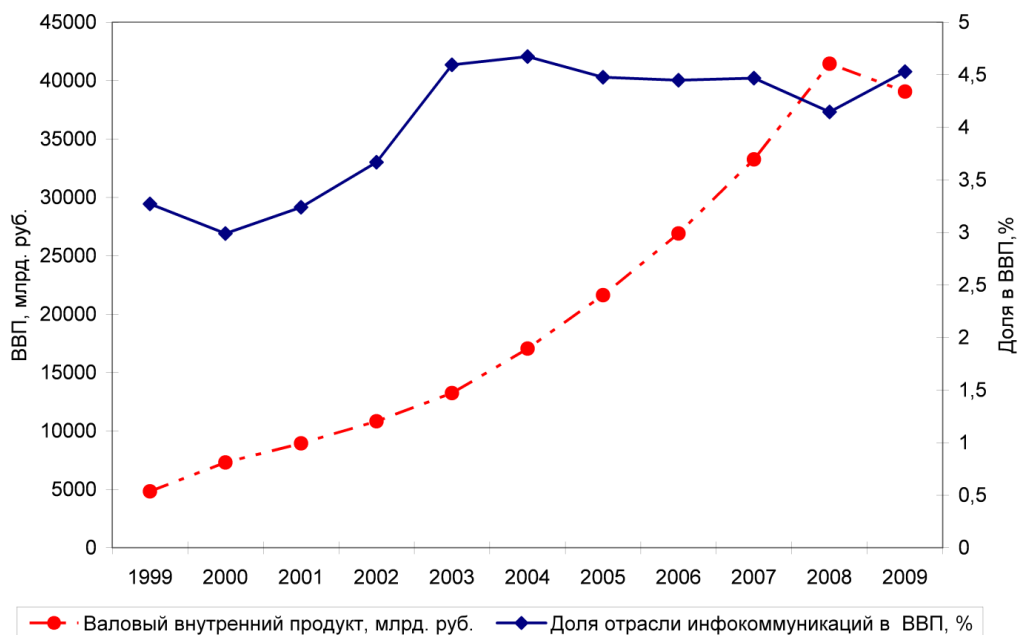
- available conditions for ICT development (Environment), i.e. general condition of business and legal environment for ICT, existing sound competition, innovation potential, necessary infrastructure, possibility to finance new projects, regulating aspects, etc.;
- human capital, i.e. Human Development Index (HDI) as comprehensive comparative Life Expectancy Index, Literacy Index, Education Index and Standard of Living for countries all over the world. It is used to identify the difference between developed, developing and underdeveloped countries as well as an index to evaluate the impact of economic policy on the quality of life;
- ICT Skills, i.e. the population's computer and technological literacy.

When projects aimed at creating high-tech telecommunication media are attached the range of overall state importance, they are meant to stimulate world-class development of Russia's telecommunication infrastructure, raise the country's status and competitiveness within the world community, and maximize the follow-up socio-economic effect through implementing and promoting the use of ICT products and services, innovative and high-tech designs in all spheres of societal activity – in private life, business and the state-run sector.

Nowadays, in the scenario of technological development Russia follows global international trends: high-speed communication technologies and those of Internet access are developing rapidly; supply and consumption of modern information and digital services is growing; demand for qualitative and diverse information, educational and entertainment content expands.

According to plans of RF Government, development of information technologies sector should convert into a main economic priority. At present, the ICT sector makes about 3.9% GDP.[2] Compared to other countries this share is insignificant. Therefore, Russia has a huge growth potential. (see Graph 1)

Graph 1
Share of ICT in Russia's GDP



Source: Russia-2012. Annual Statistics Report. M., Goskomstat, 2013. Official Rosstat website – www.gsk.ru.

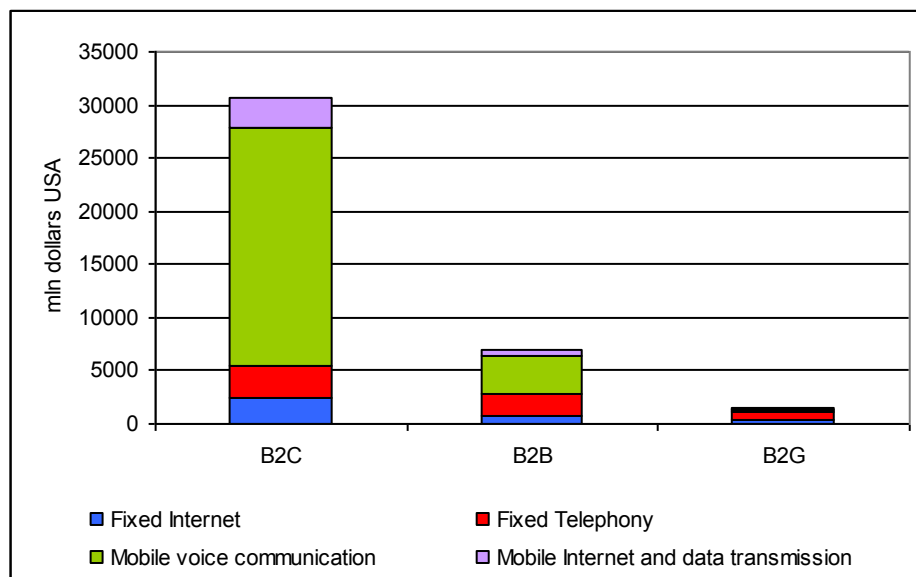
The Russian consumer market of main telecommunication services was researched in the following segments: B2C (Business-to-Consumer), B2B (Business-to-Business, including micro, small, medium-sized and big enterprises), and B2G (Business-to-Government).

The Russian telecommunication services market demonstrates rather high growth rates. February 2013 data testify that in 2012 the volume of Russian IT market reached \$36 bn, of which the biggest part (\$24 bn) fell on equipment sale, \$7 bn on IT services, and \$5 bn made software sale revenues.[3] This reflects the lowest level of market development over the last decade except for crisis years, for example the year 2008. Approximately the same growth is expected for the year 2013.

The total market size of basic telecommunication services in B2C segment reached \$30.7 bn by year-end 2011. In B2B segment providers' revenues from these services was almost 4.5 times lower and amounted to \$6.89 bn. The governmental sector spent \$1.5 bn for this type of services. The private (consumer) segment share comprises 78% in the structure of operators' revenues from main services. 18% fall on B2B market and 4% on the governmental sector. [4] At present, the mobile communication market size exceeds by many times such services volume as fixed Internet access and fixed telephony. (see Graph 2)

Graph 2

Structure of Russian market of basic telecommunication services, 2011



Source: author's calculations

After the 2009 economic crisis the following factors contributed to ICT growth:

- stable development of Russian economy in the second half of 2010 and in 2011, which allowed to raise investment in the corporate sector;
- expansion of telecommunication companies and services providers, which started to set up new data processing centers; and
- investment in e-Government programme.

Fixed Internet access

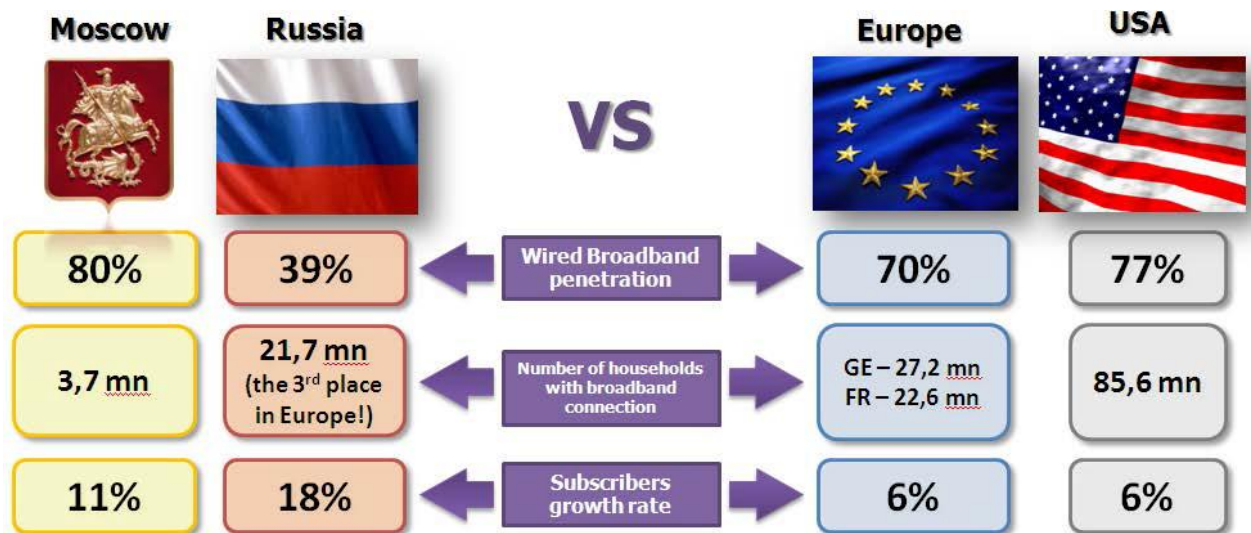
Now the penetration level of broadband Internet in Moscow and Russian cities with a million-plus population is compatible with the level of major world cities: for example, in 2010 Moscow with its penetration level of 76% lagged behind Los Angeles by 11% but was ahead of Berlin by 14%. By year-end 2011 already 80% of households used broadband Internet access.[5]

In the country on the whole in 2011 broadband Internet access was used by about 39% of Russian households (21.7 mn), of which about 38% (8.3 mn households) live in cities with a million-plus population. Nearly 18% of users are located in cities whose population ranges from 500,000 to 1 million. According to forecasts, Russian providers' revenues in the private segment will increase on average by 12% a year. [5] The penetration growth rate will, however, gradually decelerate and will be supported mainly thanks to Internet connection of small cities and settlements. For this purpose, a public register of population centers, whose citizens have no access to modern communication services, is planned to be created, as well as feedback linkage from people inhabiting problem-plagued territories.

As to the number of inhabitants using Internet access service in connected households (the traditionally taken number of Russian household members is 2.7), in 2011 our country was an absolute leader in Europe by year-end 2011. But Russia is still lagging behind world leaders (see Picture 1 below) – in Europe the penetration level comprises 70% on average, in the USA 77%. [6] Among European countries Russia occupies the third place in the number of connected households falling behind Germany and France.

Picture 1

Comparison of main broadband market indicators in Russia, Europe and the USA, 2011



Source: J'son & Partners Consulting

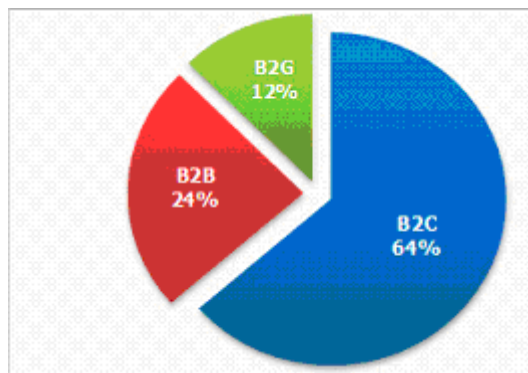
By year-end 2011, the world leader in the number of broadband subscribers is China with its 153.5 mn of connected households. The last country rounding out the top-10 is Italy (16 mn connections).

The Russian market size of fixed broadband Internet access (FTTx, ADSL and DOCSIS technologies) reached \$3.9 bn in 2011 thanks to 12% yearly growth rate.

The biggest share of this revenue volume fell on B2C segment (64 %), 24% on B2B segment and two times less on the governmental sector (12%). [3] (see Graph 3)

Graph 3

Revenue structure of fixed broadband operators, 2011



Source: J'son & Partners Consulting

About 70-80% of middle-sized, small (including microenterprises) and big businesses in major Russian cities use broadband Internet access. In the next 2-3 years the revenue of providers in B2B segment is supposed to grow by 4% a year on average.

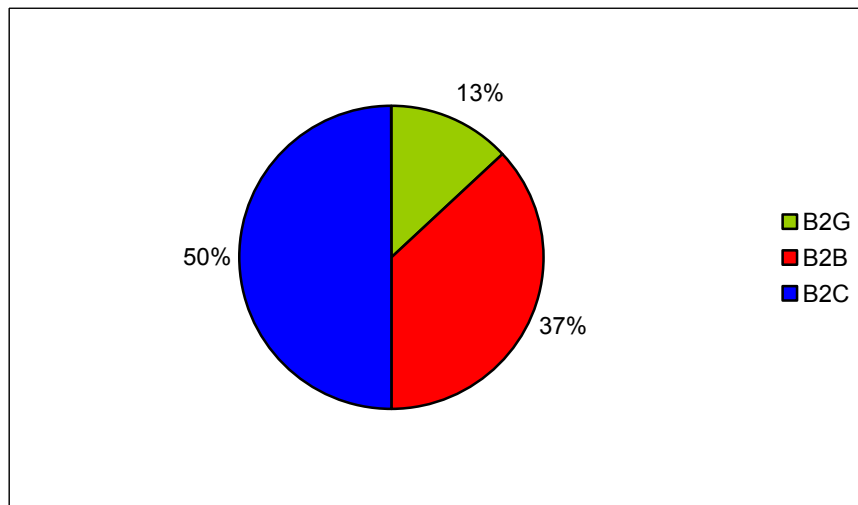
The service penetration in the governmental segment reached 94% in 2011. The market size in the governmental segment will fall by nearly 6-9% a year in the medium term, which is due in the first place to cost reduction of state contracts, cuts of budget allocation, and more strict requirements on the economic feasibility of projects cost.

Fixed telephony

Today a complicated situation has emerged on the fixed communication market, which results in subscribers' outflow to mobile communication operators offering more beneficial tariffs, as well as in the increase of VoIP-telephone users' number. In spite of this, fixed telephony remains highly in-demand in Russia and is provided in full and with proper quality.

By the end of 2011 fixed telephony market size, according to research results, was about \$6.7 bn. Due to costs reduction in B2B and B2G segments, the market size decreased during the year almost by 3%. Operators' revenues from the private segment made 50% of the total market. B2B segment makes up to 37% of the market. The governmental segment takes the remaining 13%. [2] (see Graph 4)

Graph 4
Revenue structure of operators from fixed telephony, 2011



Source: J'son & Partners Consulting

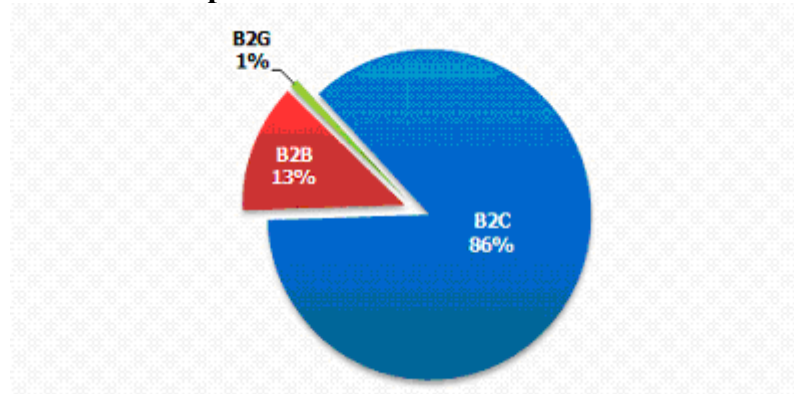
The telephone communication market in B2C segment shows a stable revenue growth, which will continue in the future. According to forecasts, the average annual growth rate will be about 5%. Its main driver will be increased tariffs introduced by the Federal Tariff Agency. In B2B segment the market size shows a negative dynamics. In the next years a decrease of the market size by 4-5% on average will be expected.

The market size in the governmental segment also shows a negative dynamics. According to forecasts the revenues will decrease by about 10 % a year.

Mobile voice communication

In 2011 the total operators' revenues from mobile voice communication reached \$26.5 bn. Compared to 2010 this indicator grew by 7%. Out of this volume B2C segment makes up 86% of the total market. In B2B segment the operators gained 13% of the total market. The operators' revenues in the governmental segment made about 1% in the general revenue structure. [2] (see Graph 5)

Graph 5.
Revenue structure of operators from mobile voice communication, 2011



Source: J'son & Partners Consulting

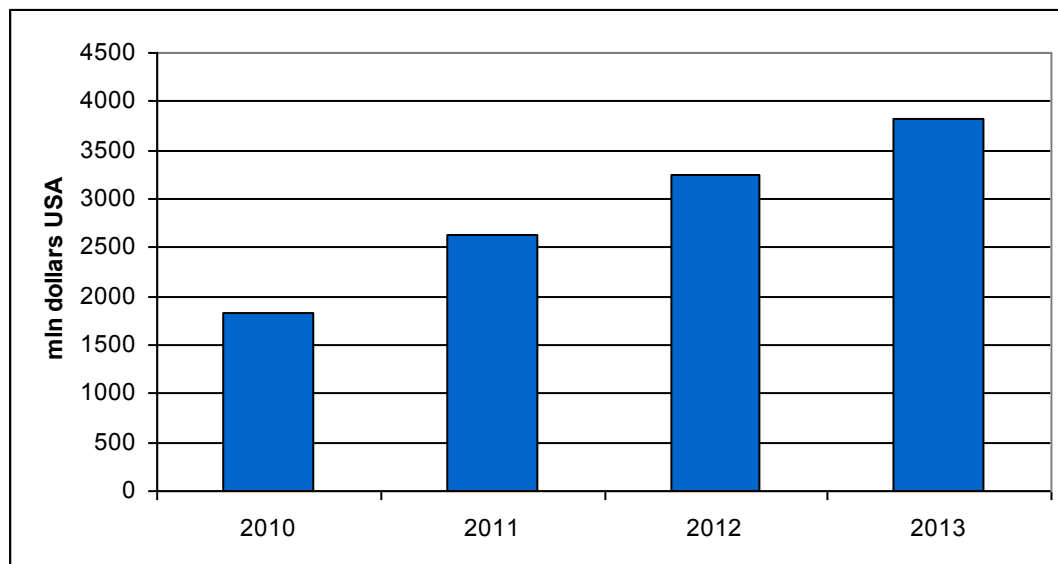
The biggest revenue growth (60%) in 2011 was recorded in the governmental segment, whose share in the general structure does not exceed 1%. In B2B segment the market size grew by 14%. In the private segment the indicator grew by 7%.

Mobile Internet access and data transmission

In recent years mobile Internet (data transmission services) was the fastest growing segment of additional services in Russian cellular communication networks: half of Russia's population uses mobile Internet, the total market size by the end of 2011 reached \$2.6 bn, thus growing by 43% as compared to 2010. [2] The basis of this growth of mobile Internet segment was an active 3G networks deployment, expanded users' audience and the consumed traffic increase. The revenues from mobile Internet access grow also due to a significant increase in sales of mobile devices (tablet computers and smart phones). (see Graph 6)

Graph 6.

Revenue dynamics from mobile internet access, 2010-2013



Source: author's calculations

Mobile Internet access service is the most popular among all VAS services offered to people. The market is expected to increase in 2013 up to \$3.8 bn with 24% growth in 2012 and 18% growth in 2013. [7]

A significant revenue growth of cellular communication operators from data transmission is caused by the following factors:

- Smart phones and tablet PC sales growth and available volume;
- 3G-USB modems sales increase;
- Changes in the model of smart phones service consumption. Growth of popularity and the number of mobile applications requiring a “functional” phone and Internet access;
- Improvement of operators 3G/4G networks coverage, increase in users number of conditionally unlimited tariffs for mobile Internet;
- Mobile and Internet space convergence.

Although the Russian IT market is commonly believed to be a developing market, analysts from Pierre Audoin Consultants (PAC) have found the first signs of its transition to the maturity stage. At the beginning of 2013 Russia took the 14th place in the rating of innovative countries. In the number of high-tech companies to the country's total number of public companies ratio Russia occupies the 2nd place giving the pas only to the USA; in the patent activity criterion the country takes the 8th place; in R&D and the number of researchers Russia is among the top-30 (the 29th and 24th places respectively). [8] Here we can draw a cautious conclusion: an innovative breakthrough begins to show up in Russia due to a qualitative change in the demand for technologies by banks and telecommunication companies. The deployment of IT in big retail networks has practically achieved saturation, the infrastructure does not yield to global retailers. However, a rather strong dependence of the Russian market is to be seen on hardware, whose share makes 46% against 27% in Western Europe.

For the moment, serious hardships emerge in sectoral management methods due to inconsistencies between the intentions of the Government and the condition of ICT infrastructure, and due to lacking competition and high level of corruption.

The complex procedure of obtaining and using a qualified electronic signature necessary to identify a citizen in the system and for him to perform legally remains a constraint in the development of ICT market and broad use of governmental services.

Numerous systemic problems such as failure to meet the date of launching important systems, excessive costs, lacking market transparency produce their adverse effect. The governmental informatization needs a reset to accelerate its movement towards an information society. Since the governmental sector is the key IT sector customer and builds up more than 50% of projects portfolio, further development of relations between the IT community and the state is impossible without an open dialogue between the parties.

The evaluation of the effect of ICT use in Russian economy is linked with certain complicated problems because, due to an impetuous development of new technologies, statistics does not fully mirror its impact. The impact of ICT on economic development takes place along two main lines. The first line refers to ICT goods and services production being one of most innovative and dynamic economic sectors, which makes an enormous contribution into economic transformation. And the second line, not less significant: the use of ICT enhances innovative development, leads to higher labour productivity, cost reduction, the emergence of new types of economic activity, and raises the standard of living. The maximal effect of productivity growth is attained not in ICT production (for example, in software or hardware production sectors) but in ICT use (integration of a company in the global network and the use of possibilities to apply software in its business model).

The diffusion of ICT through Internet and networks increasingly converts into an inalienable part of innovation economy. The basic directions of modern ICT's impact on the country's economy may be formulated in the following way:

1. The (direct and indirect) contribution of ICT is linked with the creation of new business models in production and consumption arrangements, new discoveries and inventions. The main advantages of ICT boil down to resource-saving, acceleration and consolidation of ties between economic agents, to established business principles transformation. New services markets (e-commerce, mobile communication, electronic

banking and payments, videoconferencing, e-Government, telemedicine, online learning, etc.) emerge. The role of consumer services gains momentum.

2. The efficiency of ICT moves to the forefront in economic transformation. There is a tight correlation between ICT use and GDP per capita growth. But the positive effect of ICT can be realized only after a certain threshold in accumulating the critical mass is passed. Besides, there is a time lag between ICT implementation and the moment its effect starts to manifest itself.

In 2011 McKinsey Global Institute assessed the contribution of Internet into the total GDP share as being equal to 3.4% in G-8 countries plus South Korea, Sweden, Brazil, China and India. Within this group, the lowest ICT share in GDP falls on Russia (1%) and Brazil (1.5%) and the biggest one on Sweden (6.3%). [9]

One of the ways to raise labour productivity is to lower labour input with the help of high technologies. If computers are entrusted with the bigger part of work, if they are used more and more extensively, productivity will increase. As soon as all traditional services move to the network, the country will be able to reach the productivity threshold. In this case the level of computer and Internet skills will also play an important role in the process. On average, this indicator is lower in Russia than in European countries.

Russia's ICT progress directly depends on whether an explicit concept of social, economic, technical and technological symbiosis of state and business is available - with its principal goals and aims, exact and accessible schemes of their realization. Bearing in mind how important ICT development is for Russia's economy, in January 2012 Information and Computer Technologies Industry Association (APKIT) elaborated a report entitled "Strategic Directions of Information Technologies (IT) Sector Development 2012-2020". In the report key problems and development trends of IT sector are defined in terms of a strategic perspective.

In March 2013 the Russian Government approved the "Forecast of Russia's long-term socio-economic development to 2030", which also addresses the IT market and considers the main points of the above Strategy designed by experts. It deals with creating 25 million high-productive jobs by 2020, with an increase by 1.3 times of the GDP share of high-tech and R&D intensive branches by 2018, with labour productivity increase by 1.5 times by the same time, with five Russian universities integrating by 2020 the top-100 of leading world universities, with achieving a 70% level of governmental e-services penetration by 2018, etc. [10] In other words,, the conclusion is unambiguous: ICT sector development is needed to tackle key goals of governmental policy, and the aim of creating conditions for higher competitiveness of national economy is also linked with IT development.

The authors of the Strategy advance a more concrete programme of measures to be adopted, whose list of even most pressing steps results rather impressive. It includes, for example, first of all the following: IT outsourcing development and design of requirements posed in order to introduce informatization of governmental bodies; marketing of Russia as producer of IT products and services; tax incentives for IT implementation; improvement of governmental tenders system for IT products and services; developing a set of standards to ensure electronic interaction between the state, business and the population; relaxation in fiscal requirements to IT startups, extended income tax and insurance fee privileges for IT companies; simplification of import procedures for electronics and its components; financial support for IT-oriented higher learning, refreshing programmes for IT experts; IT companies' involvement in the final-stage training process in educational institution of

higher learning; support for IT businessmen in their search for venture financing, and introducing more flexibility into recruiting and dismissal procedures in IT sector. A longer list of lower-priority measures added makes it evident that a very substantial work is in store, which will require coordinated efforts of numerous ministries and departments.

Conclusion

ICT development projects are of public and national importance for every country. Apart from an immediate economic effect of introducing new technologies, these projects can have an impact on the country's place in ICT development rating. Active support by the Russian state and the RF Ministry of Communications and Mass Media should create favourable conditions for a joint work of governmental bodies, operators and providers of new telecommunication services, and private investors, should stimulate the evolution of telecommunication infrastructure, which, in the end, is capable of ensuring Russia's yearly GDP growth and offer services of international level to the users.

Here are the long-term development priority directions:

- to form a modern information and telecommunication infrastructure;
- to ensure a high level of its accessibility, offer qualitative services on its basis;
- to promote RF economy development based on information technologies use;
- to raise the quality of education, medical services, science, social protection of the population, enhance culture and mass communications on the basis of information and communication technologies;
- to facilitate competitiveness and technological development of information and communication technologies;
- to boost the effectiveness of governmental governance and local self-governance, interaction of civil society and business with governmental bodies, including resistance to the use of information and telecommunication technologies to endanger Russia's national interests.

An essential upgrade of technical parameters (such as speed, performance, capacity, offline work duration) accompanied by concurrent miniaturization and universalization of equipment will take place. Technologies of wireless and mobile radio communications will develop apace, intellectual characteristics of software will expand. One of the key trends in the development of information and communication technologies will be the convergence of technological platforms for diverse types of information bearers (text, speech, data, video, TV and radio broadcasting).

The period of 2012-2010 can be of key importance in the formation of Russia's positive image in the world as potential leader in ICT development thanks to:

- systematic large-scale launch of 4G communication technologies (LTE) and development of modern multimedia services on their basis;
- provision of technical access to modern mass digital services, and stimulation of their use by the population, business and state servants;
- support by governmental and private investors of innovation projects for Russia
- unique and in-demand - in telecommunications and digital media;
- active partnership with leading Western players aimed at implementing successful business models, marketing practices and monetization methods for new types of services in digital media;
- formation and consolidation of modern technical and ICT education, upgrading of the population's technological literacy.

The main goals at the government level of Russian ICT sector aim also:

- to raise coordination efficiency of governmental spending for information technologies;
- to renovate legislation and normative reference information in accordance with international standards;
- to introduce e-Government, electronic governmental and municipal services to resolve internal problems - in order to raise the efficiency of state bodies - and their comfortable world-level use by the population and business;
- to enable access of small and remote settlements to modern communication services, and to bridge the digital gap.

According to International Data Corporation (IDC) assessments (as of March 2013), over the next five years Russia's IT market will grow by only 5-7% a year. Market growth will take place due to investment in the "third IT platform" comprised of mobile computing, its applications, social networking and cloud technologies. The expenses of companies for the "second platform" – standard personal computers, local and global networks based on client-server architecture – will, in the years to come, hold steady. The market will grow thanks to investment in the "third platform".

Experts claim that today less than 50% of European companies are ready to work with big data analytics as part of the "third platform", at the same time cloud technologies and social networking are in broad use.

One of the negative factors impacting the diffusion level of information technologies and information society development in Russia is the insufficient development level of many RF constituent entities. In various regions of the country the discrepancy in information technologies use by the population remains acute. For example, according to the rating of Russian regions' readiness for the information society, the leader's index exceeds that of the outsider region by more than 20 times. Problems connected with broadband access for end users continue to be relevant. As a rule, the access speed is lower in the regions and the tariffs, by contrast, are higher than in the biggest cities - Moscow and Saint-Petersburg. Lower is also the share of regional enterprises using broadband access. In order to ensure accelerated development of information society in Russia, the price of information technologies-based services offered to the population should be lower, their quality and level of accessibility higher thanks to competition between communication providers and hardware suppliers.

According to RF programme "Information society (2011-2020)" adopted by the Government, the share of households with broadband Internet access out of 100 households should reach 55 by 2015 and 85 by 2020. This growth will be achieved, among other things, thanks to active development of high-speed mobile networking of the third and fourth generations. The extension of broadband connections and improvement of other enumerated composite indicators, the bridging of the inequality gap should help Russia enter by 2015 the group of 20 leading countries as to their index of readiness for the information society, and then provide a foothold on this position by 2020 as a minimum.

Reference

1. Informatizatsiya i Rossiya – 2001. Belaya kniga informatsionnykh tekhnologiy (Informatization and Russia – 2001. White Book on Information Technologies), www.libertarium.ru/df_whitebook.

2. «Russia - 2012» Annual Statistics Report. Moscow, Goskomstat, 2013. Official Rosstat website – www.gks.ru.
3. State.Business.IT, “Tadviser@”, 04.05.2013
4. CNews, 20.10.2012
5. www.scienlife.ru/dforum/slife/136013071, 06.02.2013.
6. OECD Key ICT Indicators. - <http://www.oecd.org/sti/ICTindicators2012>
7. Forecast of Russia’s Long-Term Socio-Economic Development to 2030. Moscow, March 2013.
8. Direct Line Service. November 20, 2012.
9. Informatsionnoye obshchestvo. 2012. “Prolyot neizbezhen” (Information society. 2012. “The Failure Is Inevitable”).
10. “Information Society” (2011-2020) State Programme of the Russian Federation. Moscow, October 2010.