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Broadband Internet Access Availability in Russia: Regional Aspects

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1. Introduction

The design of a national program platform in Russia for information and communication technologies (ICT) development is one of the major factors of the country's technological independence. The restructuring of telecommunications in Russia, which is centred on a transition from 85 regional to 7 big federal-level interregional companies, is specific in its management structure, financial management, technologies and marketing. Telecommunications business spreading worldwide, rapid technology innovations in products and services offered are accompanied by shifts in business models and the competitive market structure. A need for broad target investments in setting up and developing broadband and generic access networks has become obvious.

The spread of Broadband internet access (BBA) in its regional aspects is a path to develop the Russian economy which has no alternative. It is dictated both by external challenges and internal problems linked with computerization of the country's entire territory and its regions. A high level of regional disparity in IT technologies especially evident in the so called digital inequality stands among the reasons for unequal development in the Russian regions, their low innovative activities, restricted ability to accept innovation, and their failing capacity to attract domestic and external investors. A modern competitive economy is based on broadly applied information technologies (IT) and, in particular, on enhanced BBA to stimulate economic growth, higher labour productivity and the solution of social problems.

Russian federal and regional programs engaged in tackling these tasks are aimed at creating a modern technological platform which allows important world class innovations. The evaluation of the spread of BBA relies on a system of indicative indexes reflecting the degree to which the goals set are attained; they form a methodologically tested basis and offer the possibility of comparison with post-industrial development indicators for other countries around the world. [1]

2. The methodology of researching infrastructure IT development problems and BBA spreading

The main problems faced by the regions are: creation of infrastructure elements for a sound market, incorporation of regional innovative infrastructures in national integration processes. Innovation activity efficiency of the regions depends on a set

of criteria which would - as far as possible – embrace the entire spectrum of regional activities. Supported by accumulated practical expertise, the system of indicators is expected to be adjusted and improved.

In identifying the level of BBA development in Russia the following researches have been considered:

- rating methodologies applied by the World Economic Forum and International Institute for Management Development (IMD);
- innovation capacity-building indexes developed by the United Nations Conference on Trade and Development (UNCTAD);
- assessment of knowledge economy development level by the World Bank;
- rating methods used in Europe – the European Innovation Scoreboard (EIS) and Innobarometer. Based on statistics from various sources, EIS is applied to compare, on yearly basis, the innovative activities of member countries. Innobarometer has improved EIS results by analyzing practical aspects of innovations through surveying 3,500 randomly chosen EU companies.

The European methodology is oriented at the developed statistical system of EU countries, but even here serious difficulties emerge with regional indicators. The authors of the Regional Innovation Scoreboard 2009 Methodology Report admit that for many regions not all indicators are available. The average availability of regional data for EU regions is measured at 77 percent [2]. In the European Scoreboard many indicators were reconstructed proceeding from the data on the relevant country's importance and from various correlations between available indicators.

Several Russian researches also exist in this area. In the country's regions their own approaches and assessments are often applied (for example, these methodologies exist in the Central, Volga, Urals, Siberian and other federal districts). The national and regional innovation methodologies are still incomplete in many aspects and need to be somewhat specified and amplified to take into consideration constant and newly emerging factors motivating or constraining the investment market.

The ratings are ill adapted to describe qualitative processes; those which are not described in quantitative terms, for example, changes in legislation or privileges and subsidies, cannot always be presented with the help of a set of parameters. Besides, modern economy also changes the schemes of interrelations between the agents in the course of innovation creation, therefore the list of indicators should be reconsidered from time to time. Nevertheless, despite all these drawbacks we presume the integral criterion to be the best to be employed in making a comparative analysis of various regions.

Following the logic of the European Commission the authors of the report decided in the case of Russian regions to proceed from data available in Russian statistical sources and thus form a system of indicators which would mirror the regional diversity existing in the innovation system. It is, indeed, difficult to compare Russian and European regional development. The development gap between Russia's and the European countries' information systems is very wide, therefore a comparison of regional development levels is rendered even more complicated. The rating of regions allows failures to be identified and paths mapped to improve the situation. The main feature distinguishing the methodology proposed here consists in the wide

scope of the innovation it covers; apart from traditional innovation indicators it also includes those which give an idea of the situation in the infrastructure and exchange of technology.

The analysis undertaken of how the main aspects of development (industrial parks, technoparks, scientific towns, etc) impact the innovative evolution of the Russian regions and the spreading of BBA to the internet on a national basis testifies that the most efficient assessment method to determine the innovation capacity-building of the regions implies a computation of integral coefficients for their innovative activities through a multidimensional comparative analysis and investigation of most important indicators such as:

- gross regional product;
- number of organizations applying information and communications technologies (ICT);
- internal R&D costs;
- number of advanced production technologies implemented;
- expenses made for technology innovation;
- volume of innovative products, works, services;
- capital investment;
- number of jobless.

Proceeding from these indicators and by applying a multidimensional comparative analysis an integral coefficient was computed. It is the formation of an innovative infrastructure which ensures support for small-sized knowledge-based business generation, provides for commercialization of the results of scientific works, raises the efficiency of operating high-technology companies and, consequently, ensures innovative economic development of the regions (spreading of BBA to internet inclusive) [3,4]. In this way we get the resulting ranking parameter for Russian regions classifying their innovative capacity-building over the recent period.

Table 1
The ranking of Russian federal districts in terms of innovation activities

No.	2007		2009	
	Federal district	Integral coefficient	Federal district	Integral coefficient
1.	Central federal district	0.883	Central federal district	0.900
2.	Volga federal district	0.780	Volga federal district	0.767
3.	Urals federal district	0.388	Urals federal district	0.403
4.	Northwestern federal district	0.304	Northwestern federal district	0.300
5.	Siberian federal district	0.292	Siberian federal district	0.289

Source: Internet Development in Russian Regions 2001. Vedomosti.ru/research

The shifts in telecommunications business on the world arena, produced by changes in technologies applied, products offered and concepts of services, are accompanied by shifts in business models and the competitive market structure. A need for broad target investments in creating and developing broadband and generic digital networks becomes evident.

3. Assessing modern IT infrastructure development

At present Russia is engaged in solving the complex problem of informatization of its economy and the design of a governmental strategy for developing the country's information infrastructure. World experience demonstrates that BBA penetration, if increased by 10 percent points, produces GDP growth by 1.5 percent points per year. Thanks to the internet 2.6 jobs are created for one job lost, the profit of small businesses operating in the area increases by 10 percent and more [5]. The task of setting up a modern Russian national network exceeds the capacity of any single operator, even a big one, because to cope with the task as many participants as possible have to be attracted. These must be both private telecommunications companies and various state institutions. Up to now no BBA technology exists which could be categorically declared as the most efficient. When building BBA networks Russian operators make preferential use now of FTTB (fibre-to-the-building) technology (over 10 million commutations), whereas the share of xPON makes about 1.5 percent on the Russian market [4].

Moreover, development of telecommunications infrastructure offers the chance to raise the efficiency of the entire economy and cope with many social development problems, including progress in regional job creation. With the help of modern technologies people can, without leaving their homes, gain access to qualitative education, healthcare and a broad spectrum of public services.

The volume of Russian information technologies market expanded in 2011 by almost 20 percent compared to 2010 and reached \$29 billion [1, 4]. On the national market of information technologies more than 60 percent of orders derive from the state. The second-important customer is the corporate sector. However, under conditions of crisis the state has reduced the number of orders by 40 percent; orders made by the commercial sector of the economy fell approximately by 65 percent. Information technologies are in certain demand by the retail market, small and middle-sized businesses.

The mayor contribution to the sales volume was made in from of deliveries of retail equipment, including computers, workpads and smartphones – respective sale proceeds totaled \$18 billion. The second place (with proceeds of \$5.8 billion) was taken by IT services (system integration, consulting, etc). Software ensured \$3.4 billion of suppliers' proceeds. In 2012 the volume of national IT market can account for \$33 billion. The number of plugged households should grow up to 24.7 million and BBA penetration rate up to 43 percent. By 2015 the share of fiber-optic connections of stationary BBA will grow in Russia from 50 percent in 2011 to almost 65 percent. In 2011 about 50 percent of stationary BBA connections made optical technologies (passive optical networks, PON, and active FTTB optical networks.) By 2015 the number of stationary (home) BBA subscribers will grow in Russia from 21.7 million to 32 million [6, 7].

Apart from governmental investment in the infrastructure, companies were offered a whole set of tax and customs privileges. For example, residents of special technology development economic zones were granted property- and land-taxes exemptions. The income tax rate was lowered. Besides, a lengthy transition period was introduced for

insurance payments into social funds and, what is very important, up to 2017 they will have to pay 14 percent only. A lower income tax rate of 13.7 percent was introduced for organizations (the income tax rate in force now makes 15.5 percent but the regions may lower this to 13.5 percent, whereas the general tax rate in the country amounts to 18 percent). [1] Imported foreign goods are deposited and made use of in zones with customs and value-added taxes exemption.

As of autumn 2011 the monthly internet audience in Russia amounts to 54.5 million, which makes about 47 percent of the country's adult population. In September 2011 Russia ranked first in Europe in the number of internet subscribers. The internet audience became larger mainly on the account of the regions: more than 93 percent of new subscribers live outside Moscow and Saint-Petersburg. In 2011 the internet community in the regions grew by almost 20 percent. The highest growth rates were demonstrated by the Far Eastern district, the lowest by the Northwestern district. As far as the internet penetration indicator is concerned the Northwestern district remains leading, whereas the Central, Southern and Siberian districts lag behind the average level [7].

Table 2

Internet development indicators: comparing federal districts (2011)

Federal districts	Internet penetration, %	Monthly access price, rubles	Number of domains per 1,000 users	Media activity, daily number of reports per issue	Development of regional resources, %	Share of business sites, %	Coverage by social networks, %
Central	38	193	44	8.8	10	48	91.2
North-western	49	365	34	13.5	8	31	92.7
Southern	34	344	24	12	11	40	91.2
Volga	36	184	27	12	15	46	92.8
Urals	39	167	27	18.1	11	61	92.6
Siberian	35	301	30	13.8	7	39	92.2
Far Eastern	37	936	35	16.1	0.5	34	88.0
Average per federal district	37	365	33	13	10	44	91.9
Moscow	64	74	99	21.3	15	45	93.7
Saint-Petersburg	67	74	99	21.3	15	45	93.7

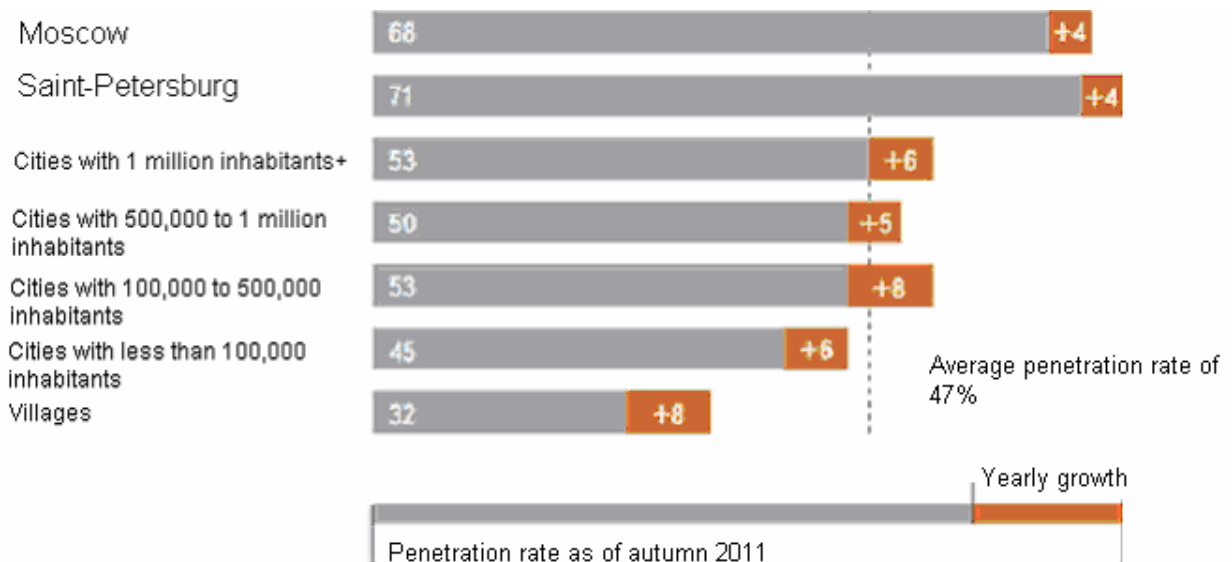
Source: "Internet Development in Russian Regions 2011". vedomosti.ru/research

Internet is most actively spreading in the countryside: over a year its audience grew by 33 percent (compare with the growth rates in the two Russian capitals which made only about 6 percent). In general, as before, Moscow and Saint-Petersburg leave the rest of the country far behind in the internet penetration rate (in percent of

population); villages and cities with up to 100,000 citizens lag behind the average Russian level [4, 5].

Graph 1

Internet penetration rates in population centres, % growth per year



Source: «Internet Development in Russian Regions 2011». vedomosti.ru/research

Considerable digital inequality constitutes a specific feature of modern Russian Internet network formation. At present a reform of universal servicing is underway; its aim is to provide a BBA able to offer any services to the country's population. In order to ensure this its operators make relevant investments. But despite all efforts made by stationary operators, despite active development of 3G networks (and 4G networks in the future) digital inequality still remains in Russian regions. At present operators invest billions of dollars in quicker-yielding regions. It should also be mentioned that in Moscow, for example, the internet access price in one or another form comprises investment into the ground-based infrastructure of at least seven operators. In principle, in the Russian capital it does not produce a critical situation for the majority of subscribers. But in small towns, moreover, in the countryside, the problem looks somewhat different. One of the elements of the present program is to stimulate operators' investments in developing joint networks in the regions, i.e. in places with solvent inhabitants, meaning big and middle-sized towns; whereas people living in small towns and settlements often find themselves excluded. To mitigate the digital inequality more time and a relevant governmental initiative are needed.

The new large-scale plan of BBA for internet development in the regions is aimed at an overall volume of private and governmental investments of more than \$20 billion. [6] The program should be directly funded by the state. In this aspect the world has accumulated rather vast experience: the goal is not only and not so much to grant

budgetary finance, as to create conditions that would make these investments profitable for private investors. Among stimulating measures there might be tax privileges; favourable regulation of companies when they play the role of investors; low-cost loans, etc.

Over a lengthy period governmental investments in telecommunications infrastructure were made following the so called 'leftover principle'. For example, as a result of implementing the well known project of informatization of secondary schools they were really plugged in but used outdated technology which does not adequately serve modern requirements of educational institutions. By 2015 the main goal is to have 90 percent of the country's population hooked up to high-speed (no less than 50 Mbit/s) Internet connections. To comply with this ambitious goal no less than \$20 billion should be invested over the next two or three years. That means not only governmental funding but also the design of a governmental program to motivate investments by private companies in setting up a modern information infrastructure in the country. If implemented, the program will help retrench huge financial means due to reduced costs of state bureaucracy, and released financial means could be channeled by the state to develop other areas of priority importance for the nation.

By the end of the 2nd quarter 2011 the number of subscribers using BBA in Russia amounted to 17 million [6]. 75 percent of them were serviced by the following Internet providers:

Table 3

No.	Company	Amount of subscribers in March 2011	Amount of subscribers in April 2011	Amount of subscribers in May 2011	Amount of subscribers in June 2011	Market share
1.	Rostelecom	6,870,000	6,930,000	6,995,000	7,065,000	41%
2.	MTS	1,807,000	1,830,000	1,848,000	1,869,000	11%
3.	Vympelcom	1,545,200	1,688,800	1,829,800	1,668,000	10%
4.	ER-Telecom	1,459,600	1,488,100	1,516,650	1,546,440	9%
5.	Akado	729,550	738,000	745,000	753,650	4%

Source: InformKuryerSvyas (IKS), 13.01.2012

By early 2012, 92 percent of residents of cities with more than 100,000 inhabitants had internet access in their households, more than 70 percent of them high-speed BBA. In the internet community the share of subscribers using internet daily is growing: according to the Public Opinion Foundation, in the period of autumn 2010 to autumn 2011 the index increased from 69 to 75 percent [3, 6].

The mobile internet audience expands two times faster than that of the internet as a whole. In January 2012 more than 22 percent of residents of all Russian cities with over 100,000 inhabitants used mobile internet devices. In the regions the price of internet services fell by 60 percent on the average, the higher price being in the Far Eastern federal district and the lowest one in the Central district, with a ten-fold price difference between them. On the whole about one third of organizations in the regions have their own websites (70 percent in Moscow and Saint-Petersburg). The highest

index is reported in the Volga federal district and the lowest in the Northwestern district [7].

The opportunity to have digital TV connection should expand from 30 percent in 2011 to 99 percent in 2015, the share of families using BBA from 45 percent in 2011 to 80 percent in 2020. The share of IT technologies sector in Russia's GDP will grow from 4.5 percent in 2011 to 7.1 percent in 2020, export of IT products from \$3.7 to \$8.1 billion [1]. But the principal goal set out by the program is to ensure by 2014 citizens' access to all federal public electronic services (according to the UNO Global E-Government Survey, Russia occupies the 59th place although our real status has been much higher ever since). A series of factors hamper real public servicing through relevant portals, among these factors are: lack of coordinated interdepartmental interaction in complex servicing; nonavailability of normative legal basis and governmental regulations for electronic servicing; the continued inefficient use of electronic digital signature.

A growing number of operators worldwide has reportedly opted for introducing Long Term Evolution (LTE) - the most advanced high-speed technology standard marketed as 4G LTE. A 50 percent increase in the number of operators around the world was registered in 2011 compared to 2010. In 2013 overall Russian operators' expenses for building LTE networks will triple compared to 2012. However, unless a coverage compatible with 2G is ensured and relevant subscriber devices developed, this service will most likely not become popular [6].

Another technology - the wireless 4G WiMAX technology - is already rather broadly applied in Russia, but it is not as promising in terms of its development prospects as LTE, since the latter can be more easily assimilated into the existing communications networks structure. There are, however, about two or three Russian operators, which intend to start working with WiMAX networks.

The growing negative effects of the financial crisis and reduced investment inflow in the country have considerably increased the shrinking of private venture funds' activities. The sectoral distribution of innovation projects (whose major parts refers to the area mentioned) looks as follows:

- information and telecommunications technologies (27.5 percent),
- energy economy and resource-saving (26.1 percent)
- biotechnology and healthcare (23.6 percent) [8].

Thus, we observe a shift in the sectoral preference of innovative projects compared to the previous year, a change of the leader in innovation: instead of energy economy and energy-saving the ICT sector moved to the forefront.

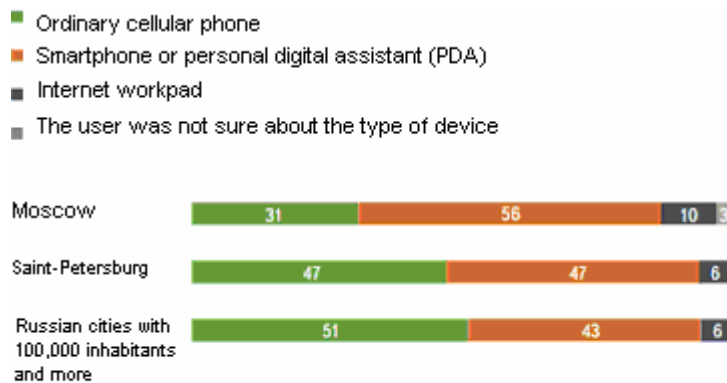
Internet availability in Russia

The internet speed is growing every year and the internet access price is falling. In 2011 the average internet access price more than halved. In the regions the most common access speed rose up to 6.4 Mbit/s (i.e. by 156 percent), in the two capitals up to 16.5 Mbit/s (by 50 percent). In January 2012 more than 22 percent of all residents of big Russian cities used various mobile devices (cellular phones, communicators, workpads) for internet access. Over the recent three years the

monthly number of mobile internet users almost doubled whereas the internet community expanded only by 50 percent [8]. By the way, as to the mobile internet penetration indicator and the rate of internet expansion, big Russian cities hardly lag behind Moscow or Saint-Petersburg. More than a half of Russians use mobile cellular phones as their principal device to access internet; about 42 percent use smartphones and communicators, the remaining 6 percent use workpads. In Moscow the proportion looks different: the majority of Muscovites (56%) use smartphones and communicators; workpads are almost twice as popular in the capital than the average for the country's other big cities.

Graph 2

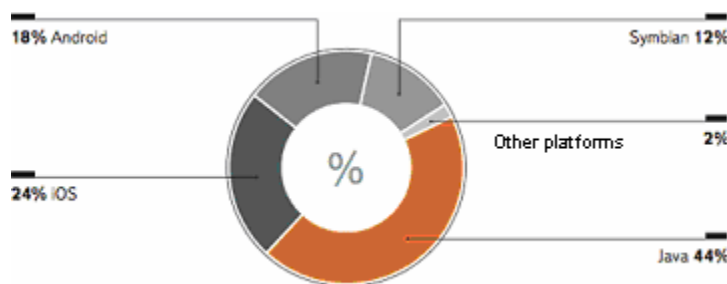
Main mobile devices used for internet access, %



Source: Yandex. Metriki, February 2012

Graph 3

Distribution of mobile internet subscribers according to platforms



Source: Yandex. Metriki, February 2012

4. BBA development prospects in Russia

Problem of sectoral modernization and spreading of BBA are being solved in Russia in the framework of federal target programs (Electronic Russia Federal Target Program inclusive). At present the design of a new long-term target program for IT social development up to 2018 has started; it contains a plan of informatization of

practically all budgetary sectors of the economy – science, education, healthcare, etc. The principal feature of the new program consists in measures aimed not only at creating but also in supporting the systems. The market players hold that in 2012-2015 expenses allocated to Russian IT will increase by 11.6% a year on the average and will amount to \$41.1 billion in 2015 (two thirds of these will be carried by the federal budget). The long-term target program is developed in accordance with the Information Society Development Strategy approved in February 2008 [6, 8].

By 2015 the country should attain the following indicators:

- as to Russia's place in international ratings of information society development: rank among the leading 20 countries of the world;
- as to Russia's place in international accessibility ratings of national information and telecommunication infrastructure for information sector players: rise to at least 10th place.
- reduce the dispersion of Russian Federation's constituents in integral information development indicators to up to two times;
- supported by all types of technologies reach BBA per 100 persons of the population up to 15 lines by 2010 and 35 lines by 2015;
- raise the availability of PCs used in households (including those with internet connection) up to no less than 75% of the total number of households.

The measures are fulfilled in the framework of respective programs thanks to allocating funds of all budget levels within the Russian budgetary system as well as to attracting extra-budgetary sources. The operability of Russian economic transition to digital technologies will be crucial for the ability of the economy to efficiently integrate with the global information space and world economy. The formula of success is a steadfast implementation of adopted federal ICT development programs and the design of new programs within the long-term target program of information society development, in particular BBA introduction over the entire territory of Russia.

5. Conclusions

- Radical changes going on in the development of information technologies (IT), telecommunications, information services, new arrangements between them place high requirements to a uniform sectoral development over the entire territory of Russia. Special attention is paid to overcoming excessive regional differentiation in IT technology equipment, including BBA.
- As to modernization of the regional ICT infrastructure and BBA spreading, particular attention is paid in Russia to specific national characteristics: its large territory, significant differentiation of the population layers, remoteness of rural areas and existence of low per capita income regions. Organizations engaged in implementing BBA technologies in these regions are supposed to be offered grants, loans, tax privileges.
- To solve these tasks Russia is striving to accelerate the creation of favourable conditions for IT sector development, foster the technological base of the infrastructure, ensure investment in designing and implementing innovations, support of competitive economic climate with active participation of the state.
- The priority direction of present-day national strategy is to create an efficient system of governmental support for spreading BBA innovations in order to provide

continuous financial monitoring of priority projects, which are aimed at creating a modern information infrastructure in the country, as well as including the information-based component in all stages of their life cycle – from designing the technical concept up to the output of end products.

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