



## **Basic Trends of Information Society Development in Russia Compared to World's Leading Countries**

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### **ABSTRACT**

The market of information technologies (hereinafter referred to as IT) is one of the most dynamically developing markets in the global economy and public relations. The information society indicators are dynamically changing not only in the Russian Federation but in most foreign countries; competitive struggle for the presence on the international market of companies from some or other countries is strengthening. In that connection, regular assessment of efficiency and performance of governmental programs and strategies implementation in the information society is an important factor creating the conditions for keeping and improving Russia's competitive advantages in the global IT market. In connection with the above, the objective of this article is to study the basic trends of the global information society development, finding Russia's place in the global ratings by the basic indicators of the sector and finding key problems and ways to solve them.

**Keywords:** Information and Communication Technologies, Media Environment, Information Technologies Sector, Information Security, E-Government

**JEL Classifications:** D83, F21, H11, O32, O33, O24, O38, O43, R58

### **1. INTRODUCTION**

Dynamic development of information and communication technologies (ICT) greatly affects the quality of life and economic development; information revolution of the late XX - early XXI century drastically changed doing business and everyday life of the overwhelming majority of people. No wonder that the information society development is the priority for most countries of the world. In 2003, at the World Summit on the Information Society in Geneva, the Declaration of Principles and the Plan of Actions aimed at the development of the information society were adopted as a tool for the implementation of the Universal Declaration of Human Rights. The Plan of Actions covers on target indicators of connection and access using ICT to be reached by 2015:

- a. Ensure ICT connection of villages and create collective access points;
- b. Ensure ICT connection of universities, colleges, high and prep schools;
- c. Ensure ICT connection of R and D centers;
- d. Ensure ICT connection of public libraries, cultural centers, museums, post offices and archives;
- e. Ensure ICT connection of health care institutions and hospitals;
- f. Ensure connection of all local and central governmental bodies and ensure that they have Web pages and e-mails;
- g. Change the programs of all prep and high schools to include the tasks put by the information society accounting for national specifics;

- h. Provide access to TV and radio broadcasting to all the population;
- i. Encourage the content development and create the engineering conditions which could contribute to the availability and use in Internet of all world's languages;
- j. Ensure ICT connection within reach for over half of the planet's population (ITU, 2003).

One of the directions of the implementation of the Declaration of Principles is the development of national strategies on ICT. According to the data of International Telecommunications Union, as on April 2010, in 162 countries the national strategies were approved for the implementation of ICT and in 14 more countries such strategic documents were being developed (ITU, 2011). The strategic documents aimed at the development of the information society are greatly in line with the structure of the Plan of Actions covering the following main components:

- Information and communications infrastructure;
- Access to information and knowledge;
- Growing potential;
- Improvement of confidence and security in the use of ICT;
- Favorable environment;
- ICT-based applications (e-government, e-commerce, e-learning, e-healthcare, e-employment, e-ecology, e-agriculture, e-science);
- Cultural diversity and cultural identity, language variety and local content;
- Mass media;
- Ethic aspects of the information society;
- International and regional cooperation (ITU, 2003).

Accounting to the dynamic development of ICT, in many countries the strategic documents have been developed and are being implemented now, aimed not only at the achievement of the basic/global target indicators but also at further development of the information society.

## 2. METHODOLOGY (REVIEW OF STRATEGIC DOCUMENTS)

### 2.1. The European Union

The basic strategic document in the development of the information society is the Digital Agenda for Europe approved by the European Commission in 2010 (Digital Agenda for Europe, 2010). That document is one of the seven priority initiatives provided for by Strategy Europe 2020 and is aimed at the maximization of social and economic potential of ICT, especially Internet, a vitally important means of economic and social activity for business, work, play, communication and self-actualization. Successful implementation of the Digital Agenda for Europe will contribute to growing innovations, economic growth and everyday life quality improvement for both individuals and business.

The implementation of the Digital Agenda is aimed at the solution of the following key problems:

- Fragmentation of European digital markets;
- Insufficient opportunities of cooperation in ICT;
- Growing cybercrime and risks of low confidence to network resources;

- Insufficient investments in infrastructure;
- Insufficient efforts in research and innovations;
- Insufficient level of digital knowledge and skills;
- Missed opportunities in connection with public changes.

Taking those issues into account within the Digital Agenda, the following key fields of the implementation of measures are recommended for all EU member countries.

- Creation of strong uniform digital market (development of electronic content, support of electronic [including international] cooperation of entities, protection of rights of individuals and entities in electronic cooperation, development of single telecommunications market). Within that field, the introduction of the uniform European licensing system in audio and visual content is considered, as well as development of access to the information on governmental authorities/bodies in Internet, development of electronic payment systems and ensuring security in the use of IT. An important unit of that field's measures is the expanding access to radio frequencies. Upon the results of that field, by 2015 the telecommunications prices for roaming in the EU should be equal to the national tariffs.
- Ensuring opportunities of technical connectivity [including M2M0 and standardization]. Within that field, improvement and harmonization of the technical standards and promotion of technological development ensuring connectivity opportunities is considered.
- Confidence and security. within that field, the measures are implemented aimed at the prevention of cybercrime, protection of personal data, ensuring security of information systems, including special measures to protect children from any harmful information, based on self-regulation.
- High-speed internet access. That field will be implemented being considered as ensuring Europe's competitiveness in the future economy - network economy, knowledge-based. To solve that task, universal access to Internet throughout Europe is guaranteed with growing speed at competitive price.
- Research and innovations. In 2009, the value added created using ICT made up a great part of the industrial production (25% in vehicle sector, 41% in consumer goods, 33% in medical sector). In that connection, lack of research in ICT is a threat to industrial production development and service sector in general. The implementation of that direction suggests great growth of investments in research and innovations in ICT both budget-funded and private (annual budget funding of R and D in ICT from 5.5-11 billion EUR by 2020 and growth of private funding from 35 to 70 billion EUR).
- Improvement of digital knowledge, skills and ensuring inclusiveness, Here it is suggested to implement the measures aimed at the popularization of ICT-related professions, improvement of training programs and ensuring access to ICT for physically challenged people.
- ICT-based advantages for public in the EU, Here, measures on the use of ICT are considered for increasing energy efficiency, healthcare development, cultural development support and making creative content, e-government services (including international), traffic control systems development.

The implementation of the Digital Agenda will ensure the achievement of ambitious targets including those in connection with ensuring access of all Europeans to high-speed Internet and expansion of ICT advantages for socio-economic development purposes. Regular monitoring of the implementation of the Digital Agenda shows that great progress has been made in the achievement of the targets determined. Upon the results of 2012, the share of people having access to broadband Internet at the speed of 30 Mbit/sec at least was 53.7% (with target value of 100% by 2020) (EU 2012).

In some member countries of the EU, own strategic documents were adopted on the information society development including its separate spheres. For instance, in Austria the national strategy on broadband Internet access till 2020 is being implemented (Breitband Strategie 2020). Under that strategy, broadband Internet access at the speed over 25 Mbit/s is provided for by 2013 and high-speed Internet access for 70% of households by 2018 and 99% of households by 2020. Similar plans are being implemented in other countries including Germany, France, Sweden (Planning for Progress 2013).

One of the latest strategies developed was the British information society strategy (Connectivity, Content and Consumers. Britain's digital platform for growth 2013).

Within that document, there are 4 basic fields of the UK's digital economy making up 8% of country's GDP:

- World class communications. Development of new technologies like cloud computing and interactive TV causes the broadband services demand and the connection speed requirements to grow. That field's implementation requires world's level of digital infrastructure. As per the results of that field's implementation, the connectivity level of high-speed broadband Internet should be 99% by 2018. Great progress (including via the allocation of radio frequencies) will be made by 4G and 5G telecommunication services. In general, private operators will receive at least 500 MHz of radio frequencies by 2020. Great efforts will be made to ensure digital inclusiveness and development of digital knowledge of the people.
- World class digital content. Here, further support of governmental TV and radio mass media will be provided. In particular, easy search of state channels regardless from the type of devices used will be ensured, digital content support measures will be implemented (for instance, tax exemption of videogames), intellectual property protection and digital radio development support.
- Consumer security. Here, ICT use security standards are implemented including Internet (including child security and rights protection) as well as personal data protection and spam fighting.
- Cost of life. Here, digital economy's products availability is ensured including on the basis of information asymmetry elimination. Here, provider change issues are considered including in the course of buying service packages, Internet traffic control, strengthening requirements to disclosure of the cost-related information, development of competition.

## 2.2. USA

The strategic document in the USA is Connecting America: National Broadband Plan, developed by Federal Commission on communications till 2020 (Connecting America: National Broadband Plan 2010).

The plan's implementation is aimed at the achievement of the following targets:

1. At least 100 million of households in the USA should have high-speed Internet access (at least 100 Mbit/s) by 2020 (by 2015, at least 100 million of households in the USA should have high-speed Internet access at 50 Mbit/s);
2. USA should become the leading country of the world in mobile innovations having the fastest and the most developed wireless network in the world (achievement of that target requires allocation of 500 Hz of radio frequencies for broadband development);
3. Each American should have broadband access at a reasonable price and the means and skills for its use. The achievement of that target should cut broadband access discrimination for various social groups.
4. Each community in the USA should have at least 1 Gbit/sec broadband access at a reasonable price to ensure connection of social institutions including schools, hospitals, authorities.
5. To ensure the national security, each official should have access to the national wireless security network.
6. To keep the US leadership in the use of pure energy sources, each American will be able to use broadband for monitoring and controlling energy consumption online.

Plan implementation tools are as follows:

- Development of policy aimed at ensuring competition in the markets and as a result ensuring the advantages for consumers, development of innovations and investments;
- Ensuring efficient distribution and management of assets controlled by government, namely radio frequencies, rights to network development and competitive access to the market;
- Restructuring of the current tools for providing universal telecommunication services to support broadband and voice communications in the areas requiring material costs from providers; ensuring price availability of broadband access for low income Americans; supporting efforts on connecting and use of ICT;
- Improvement of regulations, standards and motivations for maximization of broadband advantages in the sectors affected by the government, for example, in education, healthcare and state management.

## 2.3. Australia

In 2011, Australia approved the National Digital Economy Strategy; in 2013, it was supplemented by Advancing Australia as a Digital Economy. The National Digital Economy Strategy fixed 8 goals the achievement of which will make Australia one of the leading digital economies of the world by 2020:

- Governmental services: By 2020, four out of five Australians will choose to engage with the government through the Internet or other type of online service;

- Households: By 2020, Australia will rank in the top five OECD countries in the portion of households that connect to broadband at home;
- Businesses and not-for-profit organizations: By 2020, Australia will rank in the top five OECD countries in the portion of businesses and not-for-profit organizations using online opportunities to drive productivity improvements and expand their customer base;
- Improved health and aged care: By 2015, 495,000 telehealth consultations will have been delivered providing remote access to specialists for patients in rural, remote and outer metropolitan areas, and by 2020, 25% of all specialists will be participating in delivering telehealth consultations to remote patients. By 2020, 90% of high priority consumers such as older Australians, mothers and babies and those with a chronic disease, or their careers, can access individual electronic health records.
- Education: By 2020, Australian schools, TAFEs, universities and higher education institutions will have the connectivity to develop and collaborate on innovative and flexible educational services and resources to extend online learning resources to the home and workplace;
- Teleworking: By 2020, Australia will have at least doubled its level of teleworking so that at least 12% of Australian employees report having a teleworking arrangement with their employer;
- Environment and infrastructure: By 2020, the majority of Australian households, businesses and other organizations will have access to smart technology to better manage their energy use;
- Regional Australia: By 2020, the gap between households and businesses in capital cities and those in regional areas will have narrowed significantly.

In accordance with the amendments brought in 2013, by the end of 2017 all priority governmental services of Australia should be fully available in electronic form (including the results of governmental services); by that time, all individuals will be able to use the same authentication method for access to all priority governmental services.

The National Digital Economy Strategy also covered 35 projects (initiatives) to increase labor productivity using the digital economy's potential. Their implementation spheres are different - from digital knowledge improvement of the aged to telehealth (diabetes, oncology, eye diseases, palliative medicine), education, job searching, etc.

ICT development strategy adopted in 2010 in Japan is aimed at the improvement of everyday life and cutting production costs via the development of ICT infrastructure. Prospective market of ICT sector in Japan is assessed at 10 trillion yen. The basic directions of strategy's implementation are as follows:

- Open government principle support;
- Improvement of data use and integration in various spheres via ICT;
- Tele healthcare and IT services support;
- Use of ICT for catastrophes prevention;

- Regulatory and infrastructure restructuring including radio frequencies sale auctions.

Strategy's implementation is sought to support the transition from providing ICT-based services to individuals to the establishment of the new society governed by sovereign citizens.

### 3. RESULTS

The above review of strategic documents of various countries on the development of the information society allows fixing the commonality of problems and restrictions, which are to be eliminated by those strategic documents on the development of the information society in Russia and abroad. Those restrictions are both infrastructure-related (telecommunications development level, first of all, broadband connectivity and availability of radio frequencies for wireless communications development) and public readiness-related, availability of qualified staff (insufficient level of digital knowledge, need to improve attractiveness of ICT professions). Digital imbalance, both geographical and social is considered as an important issue (including price availability of new technologies for low income people, gender imbalance in the use of ICT, issues related to the access to the advantages granted by new technologies for aboriginal population, etc.). Among significant issues of the development of the information society, support of competition on the ICT market and information security (including child-related) are studied. To a great extent, those issues are urgent in the Russian context as well.

It is important to note that the commonality of the information society development issues greatly determines the common approaches to their solution. Surely, on the level of measures some solutions may differ (e.g., information security issues may be subject to governmental regulation in some countries while in others they may be self-regulated in respective economic sectors), but the core efforts (elimination of infrastructure-related restrictions, support of ICT development on the level of R and D, realization of projects in the governmental sector, e-commerce development, ensuring information security, etc.) are rather common in all the countries studied. The commonality of the issues sought to be solved by the strategic documents in the information society sphere makes common the goals and tasks fixed in the above strategic documents.

In the analysis of foreign strategic documents it is important to note that in many of them there are components/directions underworked in the Russian practice. For example, both in the EU, the USA and Australia one of the priorities for the information society development is resource-efficiency implementation (power, water, etc.). Today, these countries plan telecontrol over the consumption of resources in households ensuring more rational use of resources (e.g., in the EU it is expected to save 20% of power for lighting).

One of the priorities paid more attention in the OECD countries is ensuring availability of ICT for low protected social groups, first of all, for low income households and physically challenged people. The implementation of that priority suggests the access subsidies (like in the USA) and regulatory steps sought to ensure more information for users on the cost of paid content (mobile

services, Internet applications), prevention of shocking billing by providers/operators (such measures are provided for in the UK). In the EU the official goal is put forward to eliminate extra roaming charge for mobile communications (compared to the national tariffs). In Russia the solution of that task is more fragmented: Regulatory steps are made in connection with keeping the number in the event of mobile operator's change, steps are made to cut the cost of national and international roaming, but there is no separate goal in connection with telecommunications availability, realization of the information society advantages for everyone, including for low income people and physically challenged persons within the governmental program.

#### 4. DISCUSSION (CURRENT SITUATION ANALYSIS AND DEVELOPMENT PROSPECTS)

It is important to note that foreign strategic documents highly assess both the current contribution of the ICT sector in the economic development and further growth potential. Not only the performance of IT producers is assessed but also the effect of ICT use in various production and service sectors. As assessed by the EU, ICT accounts for 5% of the EU countries' GDP but the portion of the ICT sector in labor productivity is rather higher (20% directly from the development of the ICT sector and 30% more from the investments in ICT). In some EU countries, the share of ICT in GDP is yet higher (e.g., in the UK it is 8% of GDP).

According to Eurostat, in 2010 the portion of the ICT sector's value added in the total GDP of 27 member countries of the EU accounted for 4.38% (Eurostat, 2010). The share of ICT products in the EU's foreign trade with third countries in 2011 was 2.43% of the total export, while for some countries it was rather higher (in Ireland ICT products accounted for 19.35% of export to the countries not being the EU members, in Finland - 6.57%). According to the OECD, in 2011 the profit of the telecommunications sector was USD 1.4 trillion or 2.95% of the total GDP of the OECD member countries (OECD 2013).

In the Russian Federation the exact assessment of the portion of the ICT sector in country's GDP is complicated due to the absence in the All-Russian classifier of kinds of economic activities of the respective activity, causing incomplete records of the IT sector's portion in the economic results in particular. However, the telecommunication sector's 2.4%, the portion of the IT sector's employees was 2.1% of the total employment in the economy (State program "Information Society (2011-2020)," 2014).

In 2014, the Russian Federation took the 42<sup>nd</sup> place in the world by the index of development of information and telecommunication technologies with 6.7 points (the leader having 8.86). By that index, Russia is greatly ahead of BRICS (in 2014, Brazil was the 65<sup>th</sup>, China - the 86<sup>th</sup>, the SAR - 90<sup>th</sup>, India - the 129<sup>th</sup> out of 166 countries) (ITU, 2014).

But that rather high position is supported greatly by the factors not related to IT. The index covers the infrastructure related to

communications/telecommunications, Internet access and its use, education of users. By those subindexes, the Russian Federation in 2008 took respectively the 45<sup>th</sup>, the 59<sup>th</sup> and the 26<sup>th</sup> places (in 2014, the 42<sup>nd</sup>, the 44<sup>th</sup> and the 18<sup>th</sup>). Great difference by subindexes positions characterizes the delay in engineering matters of the information society establishment and development from the readiness of people to use the information society opportunities and thus determines the potential for the implementation of the state program of the Russian Federation "Information Society (2011-2020)" (Program). Second, high growth rates of the sector were ensured mainly by the emerging markets, new products/services (mobile communications, computer equipment, consulting, etc.) on the background of low level of the basic infrastructure in Russia in general.

Table 1 lists comparative analysis of the basic indicators used for the calculation of the development of information and telecommunication technologies in Russia and some foreign countries in 2014 (ITU, 2014).

As seen from Table 1, Russia is greatly ahead of developed countries regarding ICT access by the number of mobile subscribers per 100 citizens and is in general on the level of the western countries by international Internet traffic capacity. However, the achievements in the latter index directly depend on the portion of Internet users by which Russia is greatly behind all the countries considered. Russia's falling behind by ICT access subindex is mainly determined by low technical facilities of the Russian households (in 2013, only 60.6% households had a computer at home and 51.2% had Internet access). In 2014, those indexes well improved in Russia. According to the federal statistical research on the use of IT and ICT networks by people, computer-owning households grew till 69.7% and those with Internet access grew till 67.2% (Information society development monitoring in the Russian Federation 2015). Great falling behind of Russia from western countries (1.5-2 times) by the PSTN subscribers per 100 citizens was also found. Meantime, data for 2012-2013 shows that in most developed countries and in a number of countries with transition economies gradual decline of that index is seen due to wider use of mobile telecommunications. Meantime, to achieve the target goals of the state program "Information Society (2011-2020)" by Russia's place in the ICT development rating it is required to ensure further growth of computer-owning and Internet access by households (Sadovnikova et al., 2014).

In the calculation of ICT use sub index, three indicators are used, and by two of them Russia greatly falls behind the leading countries. By the portion of Internet users Russia in 2014 was over 1.5 times behind all the considered countries. According to the federal statistical research done in 2013 on the use of IT and ICT networks by people, that index in Russia grew till 64% (including 61.4% active Internet users), but to reach the top 20 level of the rating's countries further growth is required. Great Russia's delay from the leading countries was found in the number of broadband Internet subscribers. Meantime, the amended statistics of Rosstat in 2013 on the number of mobile broadband Internet users per 100 people are higher than those used by International Telecommunications Union for rating (according to Rosstat

**Table 1: Basic parameters used for calculating index of information and telecommunication technologies development in 2014**

Parameter	Russia	Korea	Canada	USA	Australia	Germany	UK	France	Japan
ICT access sub index									
PSTN subscribers per 100 people	28.5	61.6	49.7	42.2	44.3	58.9	52.9	60.8	50.4
Mobile subscribers per 100 people	152.8	111.0	78.4	95.5	106.8	119	123.8	98.5	115.2
International internet traffic capacity per 1 user	41,246	30,306	115,948	64,089	67,099	112,369	352,583	141,511	39,211
Portion of households with a computer	69.7	80.6	83.6	80.0	83.5	88.9	88.2	81.6	76.2
Portion of households with Internet access	67.2	98.1	82.6	77.3	83	88.7	88.4	87.7	86.2
ICT use sub index									
Portion of internet users	61.4	84.8	85.8	84.2	83.0	84.0	89.8	81.9	86.3
Fixed broadband internet users per 100 people	16.6	38.0	33.3	28.5	25.0	34.6	35.7	38.8	28.8
Wireless broadband internet users per 100 people	60.2	105.3	57.9	93.6	111.1	44.8	87.2	55.9	120.5
ICT skills sub index									
Literacy of adults	99.7	99	99	99	99	99	95.2	99	99
High education	95.3	97.2	103.4	93.7	135.5	101.3	95.4	109.7	101.8
Higher education	76.1	98.4	66.6	94.3	86.3	61.7	61.9	58.3	61.5

Source: International Telecommunication Union, ICT: Information and communication technologies

- 70.9%, according to ITU - 60.2%), which allows to expect further growth of the general value of that sub index in Russia in 2014.

The most inert sub index inside the index of development of IT and ICT is ICT skills sub index which relates to lack of reliable statistics for all countries of the world in computer skills and bound use of the general parameters of competence and skills level (not ICT-related). In that connection, separate use of ICT skills sub index is not recommended in the Russian strategic documents including in state program "Information Society (2011-2020)." Currently, that sub index is used in the Russian Strategy for the Development of Information Technologies (IT) sector in the Russian Federation for 2014-2020 and till 2025 approved by the Resolution of the Government of the Russian Federation No. 2036-r of November 1, 2013 (Strategy for the Development of IT Sector in the Russian Federation for 2014-2020 and till 2025-2013) and its roadmap (Plan of Actions (Roadmap) of the IT Sector Development, approved by the Resolution of the Government of the Russian Federation 2013).

In that connection, to assess the ICT-related skills of people, special indexes are more suitable. Such comparisons show that while in Russia (according to 2013 research) only 1.6% of citizens had software writing skills using programming languages, in the EU that portion was 9.44% (2012 data) (Monitoring of implementation of Digital Agenda in the EU 2012). As a result, only 3.1% of the EU enterprises (10 and more employees) experienced difficulties with employing ICT-skilled persons (for reference, in Russia the lack of qualified staff is traditionally one of the core business problems).

The analysis of the current situation in the core directions of ICT implementation was done using the international comparisons of the following sectors: ICT infrastructure, IT sector, media environment, information security, information state, post.

Dynamic development of technologies and growing public need for telecommunication services (both regarding the volume of services and their quality) ensures growing requirements to universal telecommunication services. According to the Federal Act No. 9-FZ of February 3, 2014 "On the Amendments to the Federal Act 'On telecommunications'" (Federal Act No. 9-FZ 2014) in the Russian Federation universal telecommunication

services are guaranteed, including: In communities with population over 500 persons at least one collective equipment for data transfer and Internet access without subscriber's equipment; in communities from 250 to 500 persons with collective telephone station at least one access point should be installed; access point should be connected via fiber-optic communication line and ensure data transfer to subscriber's equipment at least at 10 Mbit/s.

The implementation of those provisions ensures the creation of fiber-optic lines for over 6.7 thousand communities with population over 500 persons and orbital satellite development to provide communications in the communities where fiber-optic lines are economically unfeasible and/or technically impossible.

Communication and broadcasting satellites of the previous generation launched in 1999-2001, by 2007 have actually worked out their resources. Their replacement and development of satellite communication group are required for ensuring stable operation of mobile communications, Internet access in remote areas, digital TV and radio development.

Broadband Internet is a core area of information and telecommunication infrastructure development. In 2014, 56.5% households had broadband Internet access (in 2011, only 31%). However, Russia is still far from the developed countries by that parameter (for reference, according to International Telecommunications Union, broadband Internet is in 77.3% of USA households, 82.6% Canadian, 87.7% French, 86.2% German and 86.2% Japanese). Russia falls behind many OECD countries by the number of fixed broadband Internet per 100 people (in Russia - 16.5, while in Germany - 34, in France - 37.8, in the USA - 28).

IT sector development may be held back by low economic growth rate in general and in the regional aspect which is seen in digital imbalance of IT use in regional households. In 2009, in the rating of Russian regions readiness to the information society, leading region's index was over 22 times higher than that of the outsider region. In 2014, the level of the differentiation of Russian regions by integrated parameters of IT development dropped and was 2.3 times which also reflects great interregional differences in IT use by households and entities.

Other infrastructure-related restrictions are kept so far. Limited radio frequencies resource holds back widespread of prospective technologies in Russia including 4G mobile networks, subscriber access, wireless broadband access (WiMax services), digital land and satellite TV and radio broadcasting. The main problems of radio frequencies control instrument are related to approvals by Ministry of Defense of the Russian Federation on the use of frequency bands in most part of the available range, unreasonably long permission procedures due to regulatory fixed sequence (stages) of those procedures. In 2013, the portion of radio frequencies available for use by civil radio electronic devices was 12%.

A crucial factor of IT sector development is the investments in R and D in ICT. In 2012, the EU countries annually invested some 6.9 billion EUR of budget funds for R and D in that sphere; the volume of private investments exceeds public a few times (as assessed, some 35 billion EUR annually). The USA investments in that sector are 40% higher than in the EU. In Russia, the portion of the domestic costs on ICT R and D are 2.9% of the total volume of domestic costs on corporate R and D making up 6.1 billion USD which is insufficient to ensure Russia's information security.

The governmental system of free terrestrial TV and radio for a few decades has been the information basis for country's population due to geographical, social and economic reasons. For most population, the only source of TV and radio access is the terrestrial TV and radio. Today, at least one TV channel is available for virtually all the population. 70% of people are able to hear radio broadcasting of the required quality, and to ensure each citizen's access to all-Russian public TV and radio channels, according to Order of the President of the Russian Federation No. 715 of June 24, 2009 "On all-Russian guaranteed public TV channels and radio channels" (Order of the President of the Russian Federation 2009), it is required to switch from analog terrestrial broadcasting to digital. Besides, it should be noted that one-third of the population uses cable or satellite TV with many digital quality channels (including HD). Thus, it may be said in general that currently over 60% of Russian families are able to see 20 and more TV channels. Meantime, one-third of population is able to install HD TV (Federal Target Program for the Development of TV and Radio Broadcasting in the Russian Federation for 2009-2015).

The content of information broadcast by mass media is not always compliant with the national interests (healthcare, socially responsible behavior, educational and professional concern, traditional cultural, moral and family values) and public expectations. In that connection, a high priority is the harmonization of mass media's social functions for the purposes of gradual social development. In 2013, the portion of child and educational programs in the total broadcasting of all-Russian federal channels was 14%; further growth of social and training function of mass media is required. An important social and educative function of mass media is the digitalization of archives. In 2014, the portion of digitalized original archives was 25.1% of the total materials.

Internet broadcasting growth trend requires (besides broadband development all over the country) the amendments to the regulations on observance of mass media laws and intellectual property protection in Internet.

A high priority is protection of children from any Internet information potentially harmful to their health and/or development.

The following directions are implemented:

- Warning trackers for parents for child-negative web pages;
- Blocking dangerous content;
- Creating white and safe zone in Internet;
- Teaching children to work in Internet individually, improvement of media skills of Russian citizen (Federal Act No. 436-FZ, 2010; Federal Act No. 139-FZ 2012).

As on 2013, media skills of the Russian population were only 15% of the total population. 64% of Russians are using Internet, including 61.4% of active users. By that parameter, Russia is on the level of Central and Eastern Europe but falls behind the Western Europe (in Germany 84% of people are Internet users, in France - 83%, in the UK - 87%), in the USA (81%) and in Japan (79.1%).

As Internet is used more widely, the safety of electronic content is getting more crucial. Since the beginning of work of single automated information system (Register) on November 1, 2012 "On Single Automated Information System Unified Register of Domain Names, Web Pages References in Information and Telecommunication Network Internet and Network Addresses Allowing to Identify Web Pages in Information and Telecommunication Network Internet Containing the Information Prohibited for Distribution in the Russian Federation" (Resolution of the Government of the Russian Federation No. 1101 of October 26, 2012), as on January 14, 2014 some 81,776 searches were processed (out of them: 34,581 - drugs, 31,643 - child porno, 15,552 - suicide). Most of the dangerous information was deleted at the stage of advising web page owners. The Register contains 2,689 records, out of them 1,718 are waiting to be blocked/deleted. Out of the current records, 971 were included in Register by IP after non-deletion of prohibited information (out of them: 855 - drugs, 103 - child porno, 13 - suicide). Under Register, cooperation tools are provided for Russian Internet resources and large foreign resources like Google, YouTube, Twitter and LiveJournal.

2013 was a breakthrough in piracy fighting in Internet. In 2013, the number of legal content buyers grew: According to Russian Association of Electronic Communications they accounted for 8 million persons. Thus, the number of payers for electronic content grew by 30%.

To maintain and develop the national information resources and promote the Russian information products in the foreign markets, the government supports a number of Russian mass media (information agencies, TV and radio broadcasters, printed media). On the other hand, the membership of the Russian Federation in international organizations (including European broadcasting union and European audiovisual observatory) ensure information exchange with foreign countries and access to the flows of legal, economic, cultural and sports information.

Printed media and book publishing are still important. For instance, one-fifth of Russians gets news from the press, as evidenced by sociological polls. But the production of printed information compliant with governmental and public development priorities, reliable information about higher governmental authorities, its distribution in all regions, training mass regular serious reading habit, promotion of the Russian literature in the global markets require special actions.

An important priority here is keeping the newspaper/magazine retail networks. In that connection, in 2013 recommendations were developed and approved together with media industry and distributors, setting forth the desirable standards for such objects (Order of the Ministry of Communications and Mass Media of Russia No. 197 of July 31, 2013). The Ministry introduced them on the regional and large cities' level and arranged monitoring of their implementation. The monitoring results show some interregional difference in that sphere which may affect the availability of printed media.

The development of communications and mass media market, growing information openness of the government, public and individuals require their legal protection and safety, fair competition and economic interests balance of business entities.

Federal Service for Supervision in the Sphere of Communications, IT and Mass Communications arranges over 20 thousand of annual inspections in exercising state control/supervision of all kinds, over half of them are finished by making orders on elimination of the breaches found.

Along with the development of IT and their use in all kinds of activities, extra threats emerge including many cases of intrusions upon privacy of the Russian Federation citizens which violate their constitutional rights to privacy, personal and family secrets.

The national level of goods and services production in IT remains rather low. The Russian Federation falls behind the global leaders including electronic components base (global electronic market share is 0.5%). To overcome that situation, the following measures should be taken:

Ensuring lower rates of state non-budget funds;  
State support of IT companies with *local producer's* status.

Creating technoparks in high-tech and driving them to the rated output as growth points for innovational activity in the Russian Federation's regions.

Pilot zone of Russian grid network infrastructure was built including control and monitoring center, network traffic hubs, 4 access points, 3 centers for development and adaptation of applied software packages. However, pilot zone's results have not seen wide application.

In business, electronic forms of cooperation have not gained the momentum, also due to lack of assuredness in their safety and protection of information, lack of trust in electronic payments.

The infrastructure ensuring information security of electronic cooperation between governmental authorities and with people and organizations has not been created in full, including available tools of digital confidence, open standards of information systems interaction.

IT distribution caused objective growth of cybercrime. However, rapid growth of acquisitive crimes is seen, while material damage increases. Also, the number of cybercrimes committed by groups including transborder cybercrimes has increased. IT are becoming a tool for committing traditional (non-cyber) crimes (stealing, blackmail, fraud, terrorism).

In the national segment of Internet, protection from negative information (drugs propaganda, porno, violence and cruelty) is not fully provided. State and public security is threatened by violent, extremist or other illegal nature web pages and the use of Internet and mobile for secret communications and terrorism propaganda. Those threats are of global nature. For instance, Australia uses the following assessment scale for potential level of cyber terrorist attacks (Table 2).

Information security matters affect the corporate business as well. Each company in the UK receives 20 viruses annually and scans/checks their web pages many times a year. Large enterprises receive a virus each week, average - a virus each month. Two-third of the British companies suffered deliberate harmful attacks. One-fourth of the British companies suffered material problems - system's failure or damage of system and its elements. Viruses cause the highest damage and the reasons were mainly misuse of system by staff. Average cost of cyberattack incident in the UK was 10,000 pounds, in large companies - 120,000. One-third of the British companies experience serious problems with spam.

To protect information, companies realize own information security policies (in the UK, one-third of all companies and Two-third of large companies do so). Information protection is a priority for Russian companies as well. Recently, in Russia the portion of entities utilizing information protection means for the information transferred via global networks has grown up in the total number of entities studied (in 2013, 86.7% of entities compared to 70.7% in 2010). Electronic signature instruments are growing (in 2013, e-signature was used by 77.2% of entities, while in 2010 - 66.8%), which related to the growing electronic cooperation with credit organizations and governmental services in electronic form.

Upon the results of 2014, the UN published E-Government development Rating in which Russia moved up to the 27<sup>th</sup> place from the 59<sup>th</sup> and came close to the developed countries. Among the countries with population over 100 million, Russia took the third place after the USA and Japan. Among the Eastern Europe's countries and the Commonwealth of Independent States Russia was the first. This is the best result achieved by our country since 2003. (UN E-Government Survey, 2014). Such a significant result was contributed by the measures taken by Ministry of Communications and Mass Media, including: Introduction of e-government services, creating web pages of federal executive

**Table 2: Scale for assessment of potential cyber terrorist attacks in Australia**

Indicators	Meaning	Scale
Political motivation	For organizing a cyber terrorist attack against Australia, terrorist (s) should have rather high level (e.g., 5 out of 5 by assessment scale) of anti-Australian attitude from political point of view. Being motivated to fight against the state, terrorists are able to spread their ideology via attacks, inspire fear via attacks of state and via ICT	1-5
Terrorist group leaders should have advanced ICT skills	That potential attack level indicator requires terrorist leaders to have advanced knowledge in ICT, including: TCP/IP, advanced cryptography, bot networks, biometry and other related security technologies	1-5
Advanced hacking tools	Requires education in ICT and making software like hacking utilities and hardware	1-5
Access to new ICT	Implies access of terrorist groups to the newest ICT developments (biometry, advanced cryptography)	1-5
Terrorist insider in an organization - potential object of a terrorist attack	Function of a certain person in IT department or other corporate departments	1-5
Financing	Reflects terrorist group's resource facilities: Equipment, people. Financial opportunities assist in better planning, controlling, staff training	1-5
Total level of potential/probability of terrorist groups for attacks		6-30

Source: <http://ro.ecu.edu.au/cgi/viewcontent.cgi?article=1004&context=isw>, ICT: Information and communication technologies, TCP/IP: Transmission control protocol/internet protocol

authorities, harmonization of statistical monitoring in ICT in compliance with the international recommendations.

One of the key results in information state development was the opening of Single portal of state and municipal services (SPSS) (Single portal of state and municipal services 2015). In 2013, Chairman of the Government Dmitry Medvedev became the head of Governmental Commission for the Use of IT for Improvement of Life Quality and Business Conditions (created by the Resolution of the Government No. 1578-r of September 3, 2013, as amended on January 29, 2014 No. 87-r). The Commission developed and approved the Concept of development of tools for providing state and municipal services in electronic form, approved by the Resolution of the Government of the Russian Federation No. 2516-r of December 25, 2013 (Resolution of the Government of the Russian Federation No. 2516-r of December 25 2013) which provides for further development of Single portal of state and municipal services. The Concepts fixes the most wanted services applied for every day (15 federal and 20 regional and municipal services): Enrollment to kindergartens and schools, civil registration, transactions with real estate and vehicles, receipt of passports, pension and other social payments which need to be improved so that people would not have to come to state authorities to receive them. It will ensure continuous saving of time in dozens of million hours each year. To decrease the cultural barrier for access to information and related new technologies, infomat's interface was oriented for senior age people; SPSS hotline is working.

It is important to note that a similar assessment of e-government services availability is used in the EU. It is assessed based on 12 basic services availability (declaration of income tax, job search, social preferences, personal ID documents, registration of vehicles, construction permissions, admission to higher schools, applying to police, access to public libraries, receipt of certificates, submitting address change notifications, healthcare services). In average, as per 2010 data, the level of availability of those services in electronic form was 80.9%. Similarly, the level of

state services availability for business is assessed, using 8 basic services fully provided in electronic form: Declaring social fees, corporate profit taxes, VAT, registration of companies, submitting statistical data, customs declaration, receipt of permissions in connection with ecological regulations, state procurement. The level of those e-government services in the EU in 2010 was 89% (Digital Agenda for Europe 2015).

As on the end of 2014, about 4.3% of Russian citizens are registered at SPSS (in 2010 - 0.15%, in 2012 - 1.8%), where the information on 627 federal services and over 100,000 regional and municipal services is provided. In general, the number of citizens registered in the single ID and authentication system exceeded 6 million.

In general, in 2014 about 150 extra electronic services were realized at SPSS which contributed to the growing number of people receiving e-government and e-municipality services. The quality of those services is assessed by people higher than those provided directly by state authorities and municipalities and in multi-purpose centers. In general, the federal statistical research on the use of IT and ICT by people made by Rosstat in 2013, 30.8% citizens of the Russian Federation applying for governmental and municipal services did it via Internet. Most often, Internet was used for state services in healthcare (11.2% of state/municipal services recipients), housing and public utilities (11.1%), passports and registration at the place of residence (10.9%).

Shift to e-services in interaction with individuals and entities is an important priority of the information society development in the OECD countries as well (relevant task or direction were fixed in virtually all strategic documents of foreign countries studied). According to 2013 data, 41.3% of people were communicating with state/municipal authorities in electronic form (the highest level of e-communication is in Denmark, Netherlands and Sweden – over 75%, the lowest – in Croatia, Poland, Bulgaria, Italy and Romania – under 25%). E-communication with state/municipal authorities is exercised by 87.8% of the EU entities including

74.2% entities submitting data (filled in forms/applications) to state authorities in electronic form (OECD 2013).

According to the results of the sociological research ordered by Ministry of Economic Development of Russia in 2013, the level of people's satisfaction with state/municipal e-services quality was 81.4% against 77.6% regarding receipt of state/municipal services directly in state/municipal authorities (Yuzhakov et al., 2014).

Full operation of e-government is impossible without well-tuned tools of inter-authority e-communication. In case of common communication with the authorities, state service recipients, individuals and entities, had to personally collect all the required documents going through numerous offices, while e-government should eliminate any problems of that kind and ideally make a state service providing not more complicated than that of a utility service (water, power, etc.). To do so, it is required that authorities and their information systems would communicate with each other exchanging all the information automatically. For the implementation of that task, inter-authority information system (IAIS) was created to ensure the electronic exchange of information for the purpose of state services providing. In compliance with the Federal Act of the Russian Federation No. 210-FZ of July 27, 2010 "On Arrangement of Providing Governmental and Municipal Services" (Federal Act of the Russian Federation No. 210-FZ "On Arrangement of Providing Governmental and Municipal Services" 2010), since July 1, 2012 state and municipal authorities are not entitled to ask from individuals applying for state/municipal services any documents which are available in state/municipal authorities. As of the end of 2012, 81 state authorities and 73 regions of the Russian Federation got connected to IAIS; 261 electronic services of inter-authority communication were registered; IAIS transfers over 2 million transactions per day; since October 1, 2011 57 million requests have been transferred via IAIS. By 2014, under the execution of the RF Government's Resolution No. 1123-r of June 29, 2012 (Resolution of the Government of the RF No. 1123-r 2012), in 18 regions the information is 99% ready for submission of information to IAIS, but there are some regions falling behind. In February 2014 alone, over 3 million requests for regional information were sent via IAIS. The total number of requests from Russia's regions to federal executive authorities registered in the system reached over 252.6 million. The most active users of that information are Jewish Autonomous Oblast, Tyva Republic, Kalmyk Republic and Kemerovo Oblast. As on the end of 2014, 11,000 users were registered in the system with 1 billion of real requests annually (400% annual growth).

Since January 1, 2012 Electronic Document Managing System (EDMS) was introduced for federal executive authorities (Resolution of the Government of the RF No. 890 "On Measures on Improvement of Electronic Turnover in State Authorities" 2012).

EDMS has been growing at high rates in Russia: In 2011-2013, annual market growth is assessed at 20-35%. The governmental sector is the core EDMS user in Russia accounting for 40% of the market. Upon the results of the research on EDMS implementation

in the federal authorities done by Ministry of Communications and Mass Media in May, 2013, EDMS is used by 74 authorities, and in four of them (Ministry of Culture, Ministry of Transport, Federal Tax Service and Federal Bailiff Service) more than one EDMS were put into service. In total, in the authorities questioned, 57 EDMS products of 19 types are used. E-signature is available in 50 operating EDMS, but in 6 cases that function is not used. E-signature is not provided for and is not used in 27 EDMS. In 25 authorities, using EDMS, mobile applications are available as well.

Electronic document exchange was a success in pilot projects. Ministry of Communications and Mass Media developed the procedure on e-documents exchange in communications between federal executive authorities. That procedure was approved by Expert Council under the Government of the Russian Federation. Digital dispatch and receipt of documents with e-signature are being tested in pilot mode by a few authorities - Ministry of Communications and Mass Media, Central Office of the Government. Ministry of Finance and Ministry of Economic Development which are in general ready for paperless exchange.

In connection with the transfer of communications between individuals and state authorities and between authorities from paper to e-form, e-signature development mechanism became rather crucial. By the end of 2011, 134 attesting centers were included in the uniform space of confidence and issued some 10,000 certificate of keys to e-signatures to individuals. E-signature may be used for signing applications in e-form while receiving governmental services. Certificates and keys checking service is working in providing state services and inter-authority communication. According to Rosstat data, in 2013, 77.2% of entities used e-signature to protect information transferred via global networks.

Postal service is the basic element of each modern state's infrastructure. Despite that its significance is dropping due to decreasing written correspondence exchange as e-mail and social networks are developing, it is still an important communication instrument between the government and people (Federal Act No. 176-FZ of July 17, 1999 "On Postal Service" 1999).

The current situation with postal service in Russia in many aspects is related to the position of the national post operator - Federal state unitary enterprise Russian Post. Today, even accounting for small correspondence volume FSUP Russian Post is unable to provide due quality services.

At the same time, low salaries and qualification of staff, high volume of manual work, physically and morally old facilities and a number of other internal problems do not allow to arrange good quality service in post offices causing queues, loss of mail and other negative results.

The mounted problems of FSUP Russian Post cause a number of consequences for the state and people, namely: Bad satisfaction of people with postal services quality, online trade barriers, closing offices due to lack of staff, competitiveness deterioration and as

a result, loss of company's financial stability, growing losses and demand for governmental support of FSUP Russian Post. All that causes social strain.

Meantime, the development of e-commerce and advertising market create prerequisites and bring new requirements to postal services - good quality postal services are required for the promotion of e-commerce on a national basis, providing a unique opportunity for mass direct mail advertising.

As shown by the foreign practice, the countries with high level of welfare have high demand on postal services. The number of mail items per one household annually including letters and parcels in Germany is 525 which is 28 times higher than in Russia (919 items/year), in the USA - 1,755 items/year, 92 times higher than in Russia. The main factor of such growth is the growing number of B2C mail.

## 5. CONCLUSION

The progress in the implementation of measures and steps of legal regulations provided for by the governmental program allowed Russia to advance greatly in most of the international ratings assessing the readiness to the information society and the level of its development. As per the data of International Telecommunications Union, in 2014 Russia was in the 42<sup>nd</sup> place by IT development index. By some indicators of information and communication technologies development, Russia is among the leading countries. It is specifically important that one of the above indicators is the price availability of IT allowing to cut the digital imbalance between various social strata. As at the end of 2013, Russia was among the top 24 countries with the highest speed of Internet access which is especially impressive taking into account the geographical dimensions of our country. On the background of the high dynamics of services quality development and improvement on the broadband Internet market, Russia, as per the World Bank's data, keeps one of the lowest price levels for Internet access. For instance, the cost of unlimited Internet access in Russia at 5 Mbit/s does not exceed 5% of monthly income for 90% households. Over 35% of Russian citizens use electronic governmental and municipal services, which exerts positive impact on the satisfaction of citizens with the quality of services provided. Over 12 million persons are registered users of the Single portal for governmental and municipal services. Since the implementation of the governmental program, Russia saw dynamic development of the information and communication infrastructure, e-government tools were created and improved, the opportunity to receive state and municipal services in electronic form was obtained. Elimination of unnecessary administrative barriers in the implementation of state program with the supporting measures in the IT sector (including those for small IT companies) contributed to the development of telecommunications infrastructure and dynamic growth of individuals' access to good quality IT services. High level of income in IT sector and its rapid development compared to other economic sectors allowed to bring highly qualified staff in ICT.

Recently, some restructuring has been implemented in the information society sphere aimed to eliminate administrative barriers and ensure favorable conditions for the development of ICT, improvement of services quality in ICT. Meantime, accounting for high international competition in ICT, further steps implementation on improvement of regulations in telecommunications and mass communications. In general, Russia's goals declared in the strategic documents on the information society sphere are rather ambitious. By 2020, the Russian Federation is planned to enter top ten countries in the international rating of IT development, expansion of radio frequencies for civil use till 18%, ensuring almost 100% of broadband availability and the growth of the portion of people using governmental and municipal electronic services till 70%. The achievement of those goals will require material investments in infrastructure (public and private), development of staff potential, creating favorable investments climate for IT sector's development, meaning both external and internal investments.

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