

## Contemporary State and Strategic Directions of Developing the Information Environment of the North-Eastern Regions in Russia (With the Kamchatka Region as an Example)

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### Abstract

Information environment is the basis for the contemporary economic systems development, and a component of the production infrastructure of any territory. The present article evaluates the state, analyzes the problems, and defines strategic perspectives of developing the information environment of the remote North-Eastern regions of Russia, with the Kamchatka Region as an example. The authors specify that the development of the information environment is a vitally important factor for the North-Eastern regions of Russia that are not directly connected with the continent by means of road-transport and train communication. It must provide stable economic growth and increase in the level of people's life. According to the authors, the development of telecommunication infrastructure that connects information resources allocated territorially, and large-scale assimilation of geographic information systems based on contemporary communications must become the priority directions of developing the information environment of the North-Eastern regions.

**Keywords:** North-East of Russia; Kamchatka region; Information environment; Informatization; Information and communication technologies; Geographic information systems; Regional development strategy; Remote regions of Russia; Stable economic growth

### Introduction

Contemporary state of the information environment has an increasing influence practically in all areas of the social life. According to the World Economic Forum, the index of states' competitiveness is highly correlated to the index of information and communication technologies development in countries [1]. According to the estimations, during the period up to 2016 the market of information technologies will continue growing by not less than 5% per annum on average, i.e. it is among 25% of the world markets that develop most dynamically [2]. Over the last 10 years average rates of growth of the domestic market have exceeded the worldwide average level. Herewith, in the coming 5-7 years the Russian area of information technologies has a potential to grow much faster - by 10% and more per year [3].

In such developing regions of the central Russia as Belgorod Region, the Republic of Tatarstan, the Republic of Bashkortostan, the Republic of Komi the creation of brand new information environment, implementation of the latest information technologies and solutions has become the basis for stable economic growth. The development of information environment is a vitally important factor for the remote and under-populated territories of the North-Eastern Russia including the Chukotka Autonomous Region, Magadan region and the Kamchatka Region (Note 1) that are not directly connected with the continent by means of road-transport and train communication. This factor must contribute to economic growth and increase in the level of people's life.

The North-Eastern regions of Russia have similar conditions for carrying on business, similar natural and resource potential, typical set of manufacturing sectors and common characteristic problems of social and economic development. Consequently, the stipulation of the state and perspectives of information environment development will also be typical for all regions of this group. Herein the authors consider the state and define the key strategic directions of the development of the information environment in the North-Eastern regions of Russia with the Kamchatka Region as an example.

### Methodology

The research was based on the system and functional approach to the analysis and evaluation of the level of developing the information environment of the Kamchatka Region as a typical region of the North-East of Russia, and subsequent determination of key directions of the regional informatization development based on the conducted analysis. The authors of the article also took into account theoretic approaches of their colleagues and came down to the analysis of information environment including that in the context of the cumulative causality by showing its importance for the regional development. The analysis of statistical data was carried out relying on methods of descriptive and correlation statistics.

### Results

The priority development of information and communication technologies in the Kamchatka Region is stipulated by the following facts:

- This is a factor of integration of regional economy and social area in the all-Russian information and communication space as well as in the information and communication space of the countries of the Asia-Pacific Region (hereinafter referred to as the APR) that are potential investors for the Kamchatka Region today;

- This is a factor of increasing the quality of people's life, access to the Russian and international educational, cultural and other information resources, an opportunity to receive state services in electronic form;
- This is a new stage of the development of the state and municipal management system, and economic development, as a whole, since in order to make reasonable management solutions, it is necessary to have quick access to the constantly updated information that includes regular reports about the process of activity on providing stable development of the region, data about social and economic conditions and tendencies, the state of the environment and natural resources, etc.

Under the contemporary speed of information exchange and the level of information provision of political, financial and business

communications, stable economic development of the region is possible only on the basis of high-performance IT equipment and contemporary means of telecommunication. The North-Eastern subjects of Russia do not have such conditions. It is stipulated by a number of reasons. The key ones include detachment from the continent, the paucity of population, peculiarities of the climate, and terrain and geological structure of the area. The total area of the Kamchatka Region is 464.3 thous. km<sup>2</sup>. This is about 15% of the territory of the Far East Federal District (hereinafter referred to as the FEFD), and 2.7% of the territory of the Russian Federation. Herewith, according to the preliminary data of the Kamchatstat, the number of people as on January 1, 2015 was 317,206 people with the average density of 0.7 people/km<sup>2</sup> [4].

Indicators	2007	2008	2009	2010	2011	2012	Growth rate, %
1. Number of telephone stations, <i>units</i>	110	115	122	111	114	-	-
including in the urban area	40	45	52	55	59	-	-
in the rural area	70	70	70	56	55	-	-
2. Number of telephone apparatus of the public telephone network, <i>thous. units</i>	129.5	128.4	126.1	123.0	113.3	113.3	-12.5
including in the urban area	108.5	108.1	105.8	103.2	93.0	93.9	-13.4
in the rural area	21.0	20.3	20.3	19.8	20.3	19.4	-7.6
3. Provision of urban population with home telephone apparatus, <i>per thous. persons</i>	308.7	308.4	300.0	313.4	294.4	275.7	-10.7
4. Provision of rural population with home telephone apparatus, <i>per thous. persons</i>	241.0	222.8	225.2	215.5	222.1	208.0	-13.7

**Table 1:** Basic Indicators of Local Public Telephone Network

The current state of the information environment of the Kamchatka Region was analyzed within the performance of the agreement under the topic "Actualization of the Strategy of the Kamchatka Region Social and Economic Development up to 2025" by the Vladivostok State University of Economics and Service. The authors understand the information environment as a combination of technical and software means of storing, processing and transmitting information as well as social and economic, and cultural conditions of implementing informatization processes. The indicators that characterize the information environment can include the volume and quality of the communication services provided to the population and organizations; the level of development of information technological sphere (number of telephones, TV-sets, computers, the Internet users); the density of the territory coverage with mobile communications, volume of the transmitted and received information via the Internet; the level of using contemporary IT solutions and products both in the social and economic, and management area. Due to the lack of official statistic information on the number of indicators related to the development of information environment for 2013 and 2014, the authors consider 2012 as an evaluation development period.

According to the indicators of the statistical reports, the volume of communication services provided to the population and organizations of the Kamchatka Region got a positive tendency by 2012. As compared to 2007, it increased 1.6 times. In 2012 the Kamchatka Region took the 3rd place in Russia in terms of the volume of communication services per one inhabitant, being inferior only to the Moscow (including Moscow) and Sakhalin regions [5]. Mobile communication has the biggest share in the volume of the rendered communication services. It was 69.5% in 2012. However, high rating positions of the territory are stimulated not so much by the growth of the volume of communication services, but by low number of population with the high migration outflow. In particular, according to the Census of Population files during the period from 2002 to 2010 the population of the Kamchatka Region decreased by 35.6 thous. People [6]. It is necessary to note that the tariffs for providing communication services are rather high in the Kamchatka Region. According to the analysis of the information about the tariffs of such providers as "Megafon", "MTS", and Beeline" for 2014, the price of mobile communication services was 1.5 times higher than in the Primorsk, Khabarovsk, Amursk Regions; 1.2 times higher than in the Magadan

Region; and the price of mobile Internet services was 1.7 and 1.5 times higher, and 1.8 and 1.5 times higher for the broadband Internet, respectively.

The tendencies of the development of information technological sphere in the Kamchatka Region can be evaluated with the aid of such indicators as the number of telephones, TV-sets, computers, and Internet users.

Under the conditions of the contemporary production that develops dynamically, the availability of mobile communications is one of the most important advantages. In spite of the increase in the number of telephone stations in the region, for the period of 2007-2012 the use of stationary telephone communication decreased by 4% in Kamchatka (Table 1).

The provision of both urban and rural population with telephone apparatus decreased by above 10% from 2007 till 2012. In spite of this, the telephone density of fixed telephone communication in Kamchatka is 275.7 apartment telephone apparatus of the public telephone network per 1,000 people (with the average rate in Russia being 254.7, and 237.9 telephone apparatus per 1,000 people in the Far East) [5]. In Kamchatka there are still settlements with no stationary telephony. They include four under-populated localities of the region: Malka and Ganaly villages (Elizovo area), Karymay village and Shumny small village (Ust-Bolsheretsky area). Low density of telephone apparatus is observed in the Penzhinsk and Olyutorsk areas of the region that border with the Chukotka Autonomous Region. It is necessary to add that basically the high density of fixed telephone communications is provided due to the city of Petropavlovsk-Kamchatsky and Yelizovo area that make up so called Petropavlovsk-Yelizovo agglomeration. Its territory is about 41.4 thous. km<sup>2</sup> (8.9% of the territory), and about 80% of the population of the region live here [7].

It is necessary to emphasize that all stations of the Kamchatka Region function with new equipment, and the level of digitalization of the local telephone network has achieved 100% since 2012. In addition to the Kamchatka Region, only four Russian regions: the Republic of Ingushetia, the Chechen Republic, the Yamal-Nenets Autonomous Okrug and the Republic of Sakha have the same indicator of implementation of the digital telephony. The network digitalization

not only improves the level of telephone communication but also allows to provide users with a larger range of contemporary telecommunications services. In the Kamchatka Region the density of the mobile telecommunication is 195.6 customer devices per 100 people (with the average Russian indicator being 182.7) [5].

The dynamics of connecting to user stations (customer devices) networks shows that the number of customers of the mobile communication increased by 128.4% from 2008 to 2012. Mobile services are constantly expanded in the region. In 2014 they were rendered by the following providers: OJSC "Mobile TeleSystems", OJSC "Megafon", Kamchatka branch of OJSC "Rostelecom", OJSC "Vimpelcom", JSC "Siberian Mobile Communications". In spite of the diversity of mobile providers, only inhabitants of the Petropavlovsk-Yelizovo agglomeration have a wide choice of options to connect to this type of services.

High level of the development of mobile communications is stipulated by, on the one hand, low number of population, and on the other hand, - as a whole, by low quality of mobile services: zones of providers' networks coverage do not coincide. That's why one individual has to purchase SIM cards of various mobile providers, and the number of SIM cards exceeds the number of population many times. The increase in the number of customers using mobile communications is also explained by the entry of new providers (for example, TELE-2 Company) in the Kamchatka Region. As a consequence, the range of provided services and diversity of tariffs for the provided services are expended.

According to the statistical data, the volume of information transferred via the Internet increased more than 38 times since 2008, and was 6,770 thous. Gb in 2012. The number of public access points decreased by 9.4% (Table 2) in favor of the increase in the number of households with individual access to the Internet (Regions of Russia).

On the whole in 2012 in the Kamchatka Region the percentage of households that had a PC with the Internet access was 63.9%. It is by 12% higher than in the Far East Federal District and by 13.7% higher than the All-Russia indicator. In the region the entry of broadband access is extremely unsteady.

Indicators	2008	2009	2010	2011	2012	Growth rate %
<b>1. Number of multiple-access stations, units</b>	96	96	96	77	77	- 19.8
<b>including with the Internet access</b>	85	85	85	77	77	- 9.4
<b>2. Volume of information transmitted via the Internet, thous. GB</b>	178.1	714.9	1,899.3	3,946.4	6,770.0	38 times
<b>including the use of dedicated channel access</b>	165.4	614.8	1,846.3	3,930.5	6,723.1	40.6 times
<b>xDSL access</b>	153.5	603.7	1,573.9	2,941.0	4,098.7	26.7 times

**Table 2:** Basic Indicators that Characterize Data-transmission Networks

- Settlements with the population of more than 10 thous. people (Petropavlovsk-Kamchatsky, Yelizovo, Vilyuchinsk) have the service in 100% connection cases,
- Settlements with the population of 500–10,000 people – in 75%;
- Settlements with the population of 250–500 people – in 30%;
- Settlements with the population of up to 250 people – in 20%.

Thus, on average in the Kamchatka Region the entry of the Internet broadband access is 35–30% in connection cases. According to users, the guaranteed speed of the Internet does not exceed 128 Kbit/sec. It makes it difficult to access Russian information resources.

At the beginning of 2015, 77 inhabited localities in the Kamchatka Region were covered with the mobile networks (88.5%). 48 of them

had 2G and 3G standards. Today 12 remote settlements of the region remain without mobile communications.

Due to the geographic specificity of the region, satellite communications systems are widely used. They do not provide the required level of services, and at the present time they are poorly reliable due to the lack of orbital reserve of space crafts and dependence of satellite communications systems functioning on external factors. So, the service of the Internet broadband access (according to IPVPN technology) is provided with the guaranteed speed of above 512 Kbit/sec only for the regional resources. However, in spite of the weaknesses, now satellite systems are the most accessible form to provide the Kamchatka Region with the telecommunication services.

At the present time fiber networks of the Internet access according to the MetroEthernet and FTTB/PON technology (Fiber to the Building/Passive Optical Networks) are being constructed in Petropavlovsk-Kamchatsky, Yelizovo, Vilyuchinsk. Mainline intra-area fiber-optic communication link was laid in the Yelizovo, Milkovo, Ust-Kamchatsky and Ust-Bolsheretsky areas. Telecommunications space of the region is provided by the “Far Eastern Regional Center” company that is a branch of the federal state unitary enterprise “Russian Television and Radio Broadcasting Network” (hereinafter referred to as RTRS), one of the largest communications providers on the territory of the Far East.

TV broadcasting in the region is provided by means of digital satellite communications stations, powerful transmitters and low-power transponder. In 2012 the number of inhabitants that received digital TV programs was only 3.1% [5].

Types of communication services	Tariffs indexes by year					
	2007	2008	2009	2010	2011	2012
Postal	100	115.4	120.0	116.7	132.6	110.2
Urban telephone	106.9	114.3	110.9	115.2	108.9	106.3
Interurban telephone	96.1	96.8	108.3	102.1	100.0	100.0
Telegraph	108.4	124.4	133.5	112.0	124.6	106.8
Wire broadcasting	116.7	113.2	126.0	100.0	118.8	108.3
Wireless communications	102.3	101.1	100.0	107.8	95.6	101.1
Internet connection	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3:** Dynamics of Tariffs Indexes for Population According to Types of Communications Services, %

As a whole, it is possible to make the conclusion that the level of the development of information environment of the Kamchatka Region is weak. Low speed of data online transmission, high price of communications services (Table 3), limited coverage of information and telecommunications technologies are basically in the Petropavlovsk-Yelizovo agglomeration (it is only 8.9% of the region). In Kamchatka there is still a local approach to the region development, when the whole infrastructure is formed only in one zone that prevents social and economic development of other territories, and leads to dying-out of remote small villages and migration of people from the peninsula with rich natural resources that could be the basis for production and settlements development.

Low level of the development of the communications infrastructure of the Kamchatka Region does not comply with the standards and requirements. It will remain a constraining factor for the region economy for quite a long time. Trunk channels that unite the peninsula are based on the satellite communications that are characterized by low load capacity as compared to cable optical links. That is why in the foreseeable future the broadband Internet as well as connection of organizations (educational, medical, state, and municipal economic entities) to the Internet with the speed of 128 Kbit/sec and higher will remain one of the weak points of the development of the region information environment.

As informatization is an integral element of contemporary production, it is problematic to speak about efficient development of enterprises, especially small and medium ones [8]. The Kamchatka enterprises do not have good information websites, since contemporary platforms require a higher level of communication and data transmission speed. The lack of contemporary websites makes it difficult to promote goods and services on the market, and decreases the opportunities to attract investors. There is no edging information network as such. It would make it possible to access all information about the region placed in informational systems of all levels in institutions and organizations integrated in the unified informational network. The last is one of the reasons of low investment attractiveness of the region, because the network does not contain any information about its enterprises and resources.

The prices for mobile communication services complicate social and commercial communication with other Russian regions and bordering countries.

There is similar state of information environment in other regions of the North-East of Russia – in the Chukotka Autonomous Region and the Magadan region.

Based on the analysis of the state of information environment in the Kamchatka Region, we can define basic factors that provide the necessity of its development for the North-Eastern regions of Russia:

- Growth in demand for real time access to the constantly updated information in all areas of social and economic and cultural development by all groups of customers.
- Critical need in the development of the system of computer-assisted state services.
- According to the authors, first of all, the development of telecommunications infrastructures that unites information resources allocated territorially, secondly, large-scale assimilation of technologies of geographic information systems based on the contemporary communication systems must become the priority directions of the development of the information environment of the North-Eastern regions.
- It is necessary to specify the following strategic tasks of informatization.
- Complete coverage of inhabited localities including remote ones with telecommunications resources and high quality services.
- Creation and development of geographic information systems and multipurpose projects, development of space division databases, regional communications networks of information exchange, public information and computing resources.
- Expansion of the scope of state and municipal services with the use of electronic means of communication via state portals according to the “one contact” principle.



- Solving these tasks assumes.
- Improvement of the mechanism of involving private investments in the information and technological area.
- Creation of the system of standards of electronic interrelation of bodies of state government, administrations of municipal entities, business and population.
- Provision of efficient interdepartmental information exchange including the electronic document management system.
- Improvement of the system of providing organizations and citizens with state services, increase in the volume and quality of state services provided electronically.
- Creation of financial and credit infrastructure for carrying out flexible policy of managing the information area development by bodies of the state government.

The strategic goal of the development of information environment is to form the unified information space in order to increase the quality of the people's life, investment attractiveness of the region, and efficiency of the regional and municipal management.

## Discussion

In recent decade the directions and tools of implementing the regional policy have been chosen on the background of maximum discussion about strengthening the differentiation of social and economic development of Russian regions in the context of tendencies of general depopulation, the observed migration from small and medium-sized towns to large metropolitan cities, the continued migration of population from many regions of the Eastern Siberia and North-East of Russia [9]. Under these conditions the further development of national economy and increase in its competitiveness will considerably depend on the efficiency of comprehensive regional development that includes all areas of social life, including information [10].

Scientific literature defines information area as one of the key factors of social and economic development of states and regions and their integration into the global network of information exchange [11-15]. However, the majority of Russian and foreign researches are dedicated to technical aspects of informatization processes, influence of informatization on the contemporary society and specific individuals, and development of information society [16,17]. Only some authors pay attention to the development of information environment as the basis of stable social and economic development of regions. In particular, Rodina [18], Sazonets [19], Sun [20] and other note about the dependence of economic growth on the level of development of information technologies in the society [17-23] note that it is informatization that goes with economic growth, and not the reverse as some authors think [23]. Comprehensive theoretic analysis of the problems related to the development of information environment was described in the works of Terri Willard, Michael Halder, Arnott and other authors [24-29]. Considerably varied opinions about the mutual influence of the development of information environment and contemporary society allows to speak about the urgency of studying informatization problems and searches for directions of the development of information environment as a key factor of regional development.

## Conclusion

Formulating the results of the analysis and evaluation of the information environment of the Kamchatka Region, we will note one more time that the state of the information environment in this separately taken region is typical for all regions of the North-Eastern Russia, because they have similar geographical, natural and climatic and social and economic conditions that define the speed and level of general regional development. It allows us to be based on the initial data about the state of the information environment of a separate region and to define basic strategic directions of information environment development for all North-Eastern regions of Russia. Nowadays they include:

1. Adopting efficient technological policy that aims to modernize the existing and to implement new systems and general communications network by
  - Extending mobile coverage zone by transferring users of mobile communications to a new format of 3G and 4G technologies and forming the network of receive/transmit satellite stations covering all inhabited localities, and fixing a relevant satellite resource in the North-Eastern regions.
  - Modernizing the telecommunication on the basis of contemporary through the construction of fiber-optic communication links in terms of the land constituent of the unified universal local transport communication network, and construction of "Sakhalin – Magadan – Kamchatka UFOCL" underwater fiber-optic communication link in order to connect these regions with the continent area of the Russian Federation.
2. Creation of conditions for the development of information and communication infrastructure that aims to increase the availability of telecommunication services, implementation and development of contemporary telecommunication technologies and modes of communication, equipping basic motor transport main lines and tours with telemetric devices including contributing to the development of communication in the interests of people from small (remote) inhabited localities.
  3. Accelerated growth of the regional market of contemporary and high quality telecommunication services (data transfer, services related to the Internet access and other thematic services, mobile telecommunications, services of digital networks with the integration of servicing intellectual networks, etc.) by means of
    - Gradual creation of a system of universal servicing (providing any user with the access to the general communications network within the stipulated time and providing the user with basic communication services with the determined quality characteristics and at affordable prices).
    - Providing service providers with equal-opportunity access to the general communications network and determining tariffs for interconnection services and traffic transmission.
  4. Transfer to the digital technology of TV and radio broadcasting that provides simultaneous increase in the number of broadcasted programs.

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