



---

## Evaluating the Social Infrastructure of Municipalities

Evgeny V. Popov<sup>1</sup>, Irina S. Katz<sup>2</sup>, Anna Y. Veretennikova<sup>3</sup>

<sup>1</sup> Corresponding Member of the Russian Academy of Sciences; The head of the Economic Theory Center, Institute of Economics of the Urals Branch of the Russian Academy of Sciences; Professor of the Department "Theory of Management and Innovation", Institute of Public Administration and Entrepreneurship of the Ural Federal University named after the First President of Russia B.N Yeltsin; E-mail: epopov@mail.ru

<sup>2</sup> Researcher in the Economic Theory Center, Institute of Economics of the Urals Branch of the Russian Academy of Sciences; E-mail: irina\_katz@mail.ru

<sup>3</sup> Researcher in the Economic Theory Center, Institute of Economics of the Urals Branch of the Russian Academy of Sciences; Assistant of the Department "Regional and Municipal Economy, Finance and Security", Institute of Public Administration and Entrepreneurship of the Ural Federal University named after the First President of Russia B.N Yeltsin; E-mail: vay\_uiec@mail.ru

---

### ARTICLE INFO

Received June 21, 2015  
Received in revised from Sept. 7, 2015  
Accepted November 27, 2015  
Available online Dec. 03, 2015

**JEL classification:**

H41, H54

**DOI:**

10.14254/1800-5845.2015/11-2/2

**Keywords:**

Public goods  
Social infrastructure  
Territorial accessibility  
Municipalities  
Social satisfaction of the population

---

### ABSTRACT

The present paper sets out to examine the nature and composition of the concept of social infrastructure, to assess the spatial accessibility of public goods that comprise the social infrastructure of urban areas and to formulate hypotheses to account for the influence of a number of different factors on social infrastructural development. The selection of primary research methods is determined by the specific character of studies aimed at assessing the degree of public satisfaction with the spatial accessibility of social benefits, i.e. an empirical survey of respondents combined with statistical analysis. The following results were produced in this investigation. The level of development of the local public sector is proportional to the level of social satisfaction of the population and there are significant differences between territories in terms of the allocation of infrastructural facilities. In addition it was shown that the population of the territory determines the financial capacity for the provision of public goods and that the level of economic development influences the extent of the bureaucratic burden, the transparency of government and the level of public satisfaction with the work of executive authorities. The practical significance of the study lies in the possibility of using the results to develop recommendations to representatives of public authorities regarding the social infrastructural development of municipalities at the same time as increasing the social attractiveness of the territories.

---

## 1. INTRODUCTION

The level of social infrastructural development of a territory is one of the features of its competitiveness; in particular, its social attractiveness. In general, infrastructure is understood in terms of the set of interrelated service structures or objects that consist in and provide the

basis for the functioning of the socio-economic system. In this connection, the social infrastructure, considered as the object of this study, is defined as the set of elements that create and provide the conditions for the spatial and temporal organisation of the lives of the population in the context of their needs and values as well as their social, demographic and other characteristics. It should be noted that, due to the significant distinguishing characteristics of the formation of the social infrastructure of rural areas and cities, the specified object of the authors' study was limited to municipal entities.

Social infrastructure establishes the necessary conditions for supporting social needs and improves quality of life, creating conditions for stability, security, law and order, as well as supporting the development of sport, culture, health and educational services (Nesbitt and Ziller, 2001). The social infrastructure problematic is closely linked to research on quality of life and social well-being. Such studies, finding their basis in the writings of Nobel laureate D. Kahneman (Rabin, 2003) and John D. Kahneman (Rabin, 2003), as well as those of J.K. Galbraith (Galbraith, 1973) and R. Layard (Layard, 2006), include the influence of the infrastructure on the formation of the qualitative characteristics of a territory's social environment.

At the same time, any consideration of the social infrastructure should be addressed towards public, socially significant benefits, the research foundations of which were may be accessed in the works of Paul Samuelson (Samuelson, 1954), R. Musgrave (Musgrave, 1959), H. Margolis (Margolis, 1982), M. Olson (Olson, 1965) and others. When analysing the social infrastructure of cities, additional reference can be made to the academic literature that deals with problems of their internal structure and size as well as with the optimal placement of public service facilities and the classification of the branches of the city's social infrastructure (Henderson, 1977). Special attention should be paid to the regulatory issues concerning the provision of public goods. In this connection, the work of the French economist J. Tirole (2014), which provides a detailed consideration of the mechanisms used to stimulate the production of public goods, was recognised in his awarding of the 2014 Nobel Memorial Prize in Economic Sciences.

One of the most important parameters that characterise a city's social infrastructure consists in its spatial (territorial) availability. The *spatial (territorial) availability of social infrastructure* is understood in terms of the rational distribution of social facilities, providing unimpeded public access to the available resources. However, due to the features of the development of a region (or a municipal formation) depending on many different factors, the question concerning the optimal allocation of public goods that contribute to the social attractiveness of a region and the level of development of its social infrastructure remains open. In order to make a more detailed study of this area of research, it is first necessary to examine how public goods are currently distributed in urban areas and how the manner of this distribution affects the level of social satisfaction of the population.

Consequently, the aim of this study is to evaluate the spatial accessibility of public goods that form the social infrastructure of urban areas. Over the course of the present study, the authors considered the social infrastructures of individual territories within the Russian Federation. In order to present a characterisation of trends in the social infrastructural development, literature dealing with the concept and structure of social infrastructure as well as its institutional features was reviewed and a number of hypotheses were formulated. Corroboration of the indicated hypotheses was carried out by means of an empirical study, whose results were analysed in conformance with a formulation of the general trends obtaining within the respective territory.

## 2. SOCIAL INFRASTRUCTURE

One of the characteristics of the level of development of the social infrastructure is the efficiency of material resources used in order to improve the quality of life within a given territory; this also serves as an indicator of the level of its socio-economic development. Within the framework of the present study, a special focus is placed on an analysis of the municipal infrastructure; this is understood as the set of industries that serve to create and support the organisational, economic and social conditions in a particular area, taking into account specific features that support the normal functioning of the economy and the quality of life of the population.

In the process of developing the social infrastructure of the municipalities, the participation of the following subjects is noted:

- the State in the form of bodies for taking decisions and monitoring their implementation;
- state-owned enterprises;
- the general population;
- private companies involved to varying degrees in the production process.

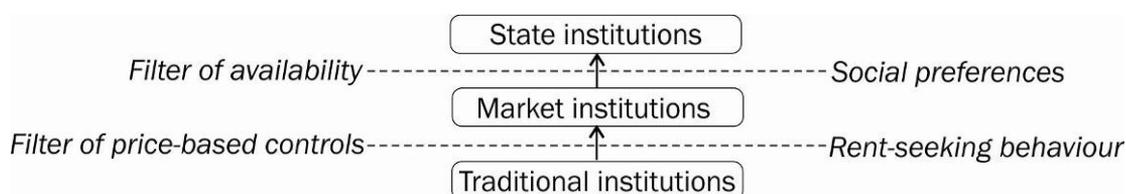
Among the features of the development of the social infrastructure, it is necessary to note the following.

Firstly, the direction of development and specificity of the social infrastructure is determined, above all, by the needs of individuals. In general, the list of requirements is fairly standard; however, the set of benefits and the means by which they may be satisfied varies depending both on the developmental level and on the cultural characteristics of a given territory.

Secondly, due to the growing needs of the population typically associated with the economic development of a given territory, its social infrastructure tends to become gradually more complex over time. If household requirements are not being met by traditional institutions, individuals are forced to turn to market-based exchanges at which point they collide with the filters of price-based controls and the rent-seeking behaviour of agents in the respective markets. If the market mechanism is also unable to meet the needs of individuals, the State may intervene to meet these needs, guided by social preferences to overcome the filter of market availability (Fig. 1).

A description of the relationships between the different types of institutions is schematically represented in Fig. 1.

**Fig. 1.** Institutional mechanisms for the satisfaction of needs



In this connection, the role of the State may differ from the institutional mechanisms for controlling interactions between agents (the legal environment) up to a full commitment to provide the necessary infrastructure. The choice of using one organisational mechanism or another for meeting the requirements is contingent on savings in transaction costs (Popov, 2014).

With the aim of revealing the composition of the social infrastructure of a particular territory, various mechanisms denoting its differentiation have been taken into account. In particu-

lar, the social infrastructure was divided on the basis of its spatial characteristics into international, national, regional, etc. One of the most recent tendencies is to conditionally divide infrastructure into two parts according to the parameters of production and social facilities: "hard" and "soft." By "hard" infrastructure we refer to the significant physical networks (transport, roads, communication) that are necessary for the functioning of a modern industrial country. "Soft" infrastructure, on the other hand, consists of institutions that are needed to maintain the country's economic, health, cultural and social standards. Under the terms of "soft infrastructure" are also included such social systems such as finance, education, health, public administration and law enforcement agencies, as well as emergency services. In other words, the term "soft" infrastructure refers to all institutions that are necessary for the healthcare, cultural and social conditions of the country, the State and the company.

With the exception of buildings and structures, all these elements are public goods. Thus, in our analysis of public (socially significant) benefits, we can use the existing classification system at the same time as taking into account their particular characteristics (Popov and Katz, 2014).

Taking into account the practical competencies of the municipal authorities, the following infrastructure facilities were identified:

- Local utilities, including electricity, gas, hot and cold water, heating, cleaning of the local environment;
- Unified communal utilities, including the construction and repair of roads, landscaping, waste recycling, urban lighting;
- Public transportation at the urban and regional levels;
- Education and information, including kindergartens, schools, colleges and universities, post-graduate education, regional mass media, libraries;
- Healthcare (hospitals, ambulances, clinics, etc.);
- Recreation and culture facilities (parks, public gardens, children's playgrounds, sports clubs and playing fields, museums, theatres, zoos and the like).

The presented activities generally reflect the composition of the public goods provided by the social infrastructure at the level of the municipality. The impact of urbanisation on the development of municipalities has led to the formulation of hypotheses concerning the impact of the size of the settlement on the accessibility of a given infrastructure facility, the uniformity of distribution of social facilities according to the demands of the population, the size and the structure of the local sector, the distribution of public good and the elasticity of demand for public goods.

### 3. METHODS

The selection of primary research methods is determined by the specific character of studies aimed at assessing the degree of public satisfaction with the spatial accessibility of social benefits, i.e. an empirical survey of respondents combined with statistical analysis.

Over the course of the study, the following hypotheses were formed:

1) *The characteristics of the level of development of the local public sector is a more significant parameter in determining the level of social satisfaction than gross regional product (GRP), average income or the cost per square metre of residential real estate.*

2) *There are significant differences between territories in terms of the allocation of infrastructure:*

- a) the smaller the town, the higher the availability of territorial infrastructure;
- b) the smaller the town, the more evenly distributed the infrastructure, as well as the less satisfied the population with the volume and structure of the local public goods sector;
- c) the smaller the town, the less elastic the demand for local public goods.

3) *The differences in the development of infrastructure across the different territories are due both to divergences in socio-demographic terms as well as to variation in financial capacity and bureaucratic arrangements:*

- a) The larger the population of the territory, the more significant its financial capacity for the provision of public goods and the greater its financial independence;
- b) The more economically developed the territory, the lower the bureaucratic burden on the population and the higher the information transparency of the authorities;
- c) The more economically developed the area, the higher the satisfaction of the population with the organs of executive power;
- d) The more diverse the cultural, ethnic and age composition of the population, the lower the assessment of the executive authorities;
- e) The higher the dynamics of population growth, the higher the expenditure on social services.

The authors used data provided by the Federal State Statistics Service as well as that obtained from the empirical study.

The questionnaire prepared by the study was posted on the website at ianketa.ru and included 16 closed questions aimed at evaluating the relevance of infrastructure to the respondents, the disclosure of territorial availability of the test list of benefits (facilities for health, education, recreation and culture, security and policing, consumer services, transport, etc.), the level of social infrastructure development from the perspective of the population, an estimate of the elasticity of demand and social satisfaction as well as measurement of relevant socio-demographic characteristics.

The evaluation of the infrastructure was carried out with the help of quality and availability indicators, subjectively measured by the respondent according to a 10-point scale. Territorial accessibility was measured by the time spent by the respondent to access the relevant infrastructure facility in regular use of the social good with additional evaluation being expressed in kilometres. In order to estimate the elasticity of demand, a question was asked concerning to what extent a change in the volume of a particular use of the infrastructure facility changes if the unit price of the benefit is varied by 10%. The evaluation of social satisfaction was performed by grading against a corresponding 10-point scale.

A total of 1315 questionnaires were received, out of which, after rejections were taken into account, a response of 1143 adult residents of different cities of Russia remained. Of the 23 cities participating in the survey, 18% were small, 26% were average, 20% were large and 36% had over a million inhabitants (corresponding to the distribution of the 2010 census of 28%, 28%, 16%, 27%, respectively). The resulting sample is declared to be representative and the data to be reliable. The standard error of the sample does not exceed 5%.

In confirmation of hypotheses 1 and 2, a correlation analysis of the data sets obtained during the interview was carried out as well as relevant statistical characteristics represented by the Federal State Statistics Service.

Regarding the confirmation of the hypothesis, three databases were compiled from national statistics on the size of population of the territory, which showed gross regional product, the volume of tax revenues raised from the Russian Federal Subject and grants issued to thereto from the federal budget as well as the expenditure amounts of the consolidated budget of the

Russian Federal Subject in terms of the cost of the employees of state authorities and local self-government. The correlation analysis yielded the results detailed in the following section.

In identifying patterns between the economic development of the territory and public satisfaction with the work of executive bodies, two indicators characterising the satisfaction of the population with the work of state bodies were considered: the population's evaluation of the executive bodies of the subjects of the Russian Federation (on a 100-point scale) and the satisfaction of the population with the activities of the executive authorities of the Russian Federation (percentage of respondents). Both of these indicators were analysed with respect to their effect on the economic development of the region (GRP and GRP per capita).

In order to assess the diversity of the population (hypothesis 3d), the ethnic composition of the Russian federal subject was analysed against ethnicity criteria. The proportion of ethnic Russians in the total population was chosen as a basic comparative indicator. The evaluation of the influence of diversity on the age demographic was conducted in relation to the birth rate relative to the number of retirees, with generational diversity defined as the proportion of births on the proportion of pensioners, as well as serving as an indicator of natural population growth.

The composition of cultural diversity was assessed by attendance of theatres, museums and libraries as well as the proportion of people with higher education and the number of graduates of different levels of educational achievement against the proportion of those defined as living in poverty. Dependency indices were examined both in relation to the indices themselves and in relation to the weighted values, demonstrating the culture gap between the various population groups.

The second part of the study aimed to provide a more detailed account of the spatial accessibility of infrastructure facilities, resulting in an analysis of the three regions of Russia consisting of Moscow, Sverdlovsk and Chelyabinsk. The aim of this in-depth analysis was to identify the weakest points in relation to security of the necessary infrastructure of the Russian Federation, as well as determining the value of the dependency between the real needs of the population of the regions and the regulations established in each region<sup>1</sup>.

The choice of the presented methods of investigation is due, on the one hand, to their simplicity, and, on the other, the ability to show trends in the development of the territory's social infrastructure. The difficulties encountered at this stage may be associated with an incomplete match of the characteristics of the sample population.

## 4. RESULTS

From the study of territorial availability of public goods that form the social infrastructure of urban areas, the following results were obtained. As part of the verification of the hypothesis 1, a weak dependency was found between the level of security in relation to the social benefits of the gross regional product, considered as the main indicator of development in the region ( $r=0.06$ ), the average salary, considered as the main indicator of well-being ( $r=0.15$ ), and the cost of per sq.m. of residential real estate, is regarded as one of the characteristics of the level of infrastructure development ( $r=-0.25$ ).

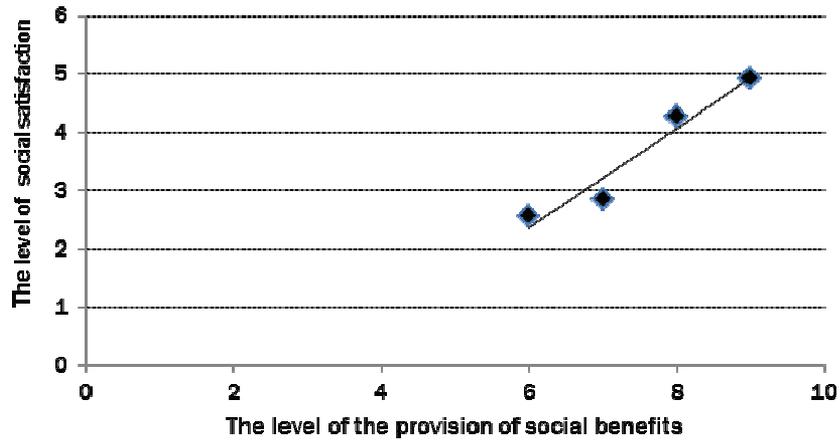
This denotes a stable positive dependency between the level of provision of social benefits and the level of social satisfaction ( $r=0.56$ ). Figure 2 shows the change in the mean levels of social satisfaction at different levels to ensure social benefits.

---

<sup>1</sup> Moscow Region Urban Planning Regulations of January 16, 2012 № 24/54; Sverdlovsk Region Urban Planning Regulations of 15/03/2010, № 380-PP; Chelyabinsk Regional Planning Regulations (draft).

(Norms of urban planning of Sverdlovsk region 03.15.2010, № 380-PP; Norms of urban planning of the Moscow region, 16. 01 2012 № 24/54; The regional urban planning regulations of the Chelyabinsk region (draft). URL: pravmin74.ru/sites/default/files/proekt\_rgncho\_-\_skor\_.0.doc)

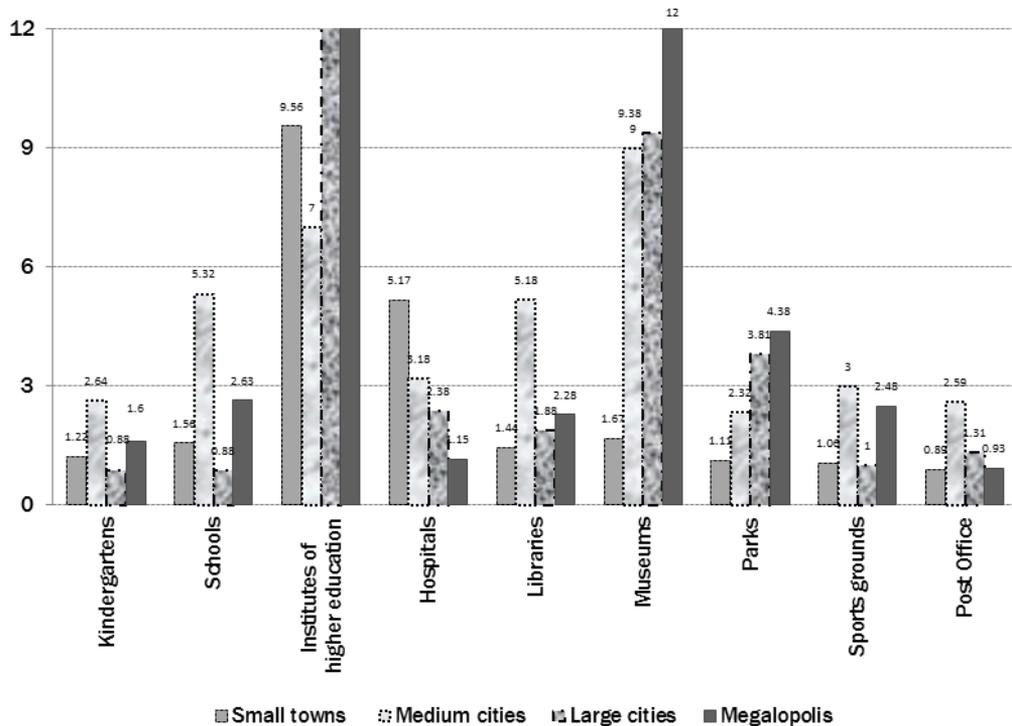
Fig. 2. Level of satisfaction with the level of the provision of social benefits



Consequently, hypothesis 1 was confirmed.

Regarding the verification of hypothesis 2a, concerning the influence of the size of the settlement of the territorial availability of social infrastructure, demonstrated that the closest correspondence to the criterion of territorial accessibility was for kindergartens, post offices and sports fields – the average distance of these facilities from consumers is 1.5-1.8 km. In this connection, the territorial accessibility (distance from consumer) for these facilities is characterised by medium-sized cities. The most significant differentiation was demonstrated in terms of accessibility to museums and universities – the distance varies from 1 to 13 km, with maximum values typical for megacities. The distribution of accessibility of cities by type is shown in Fig. 3. On average, the accessibility of these facilities reduces with an increase in the size of the city, confirming the hypothesis.

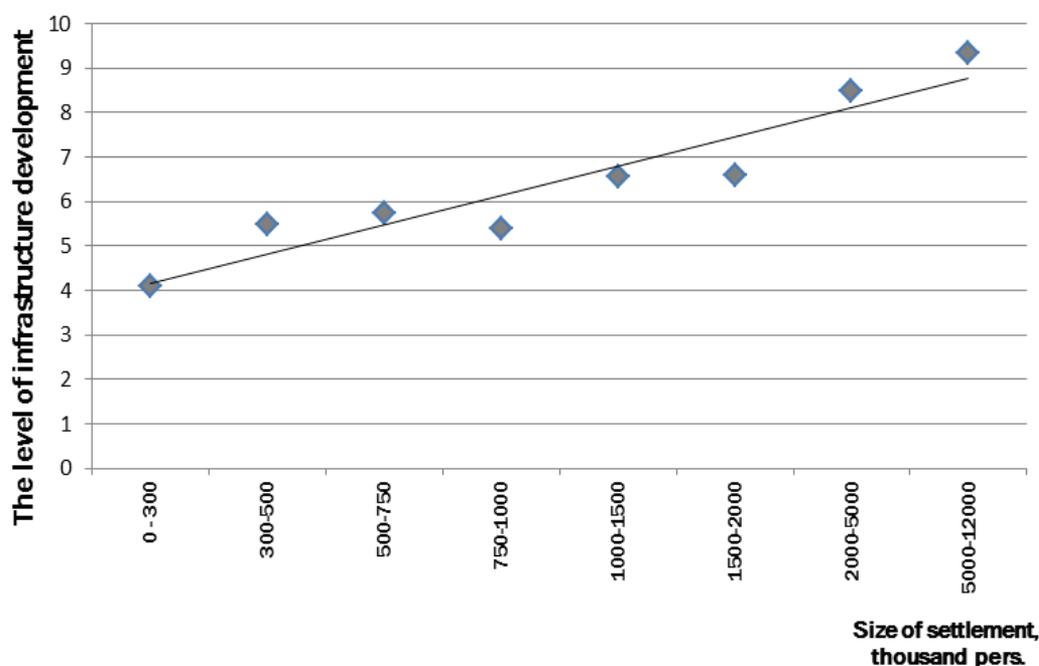
Fig. 3. Distribution of territorial accessibility (km) by type of urban infrastructure



When testing hypothesis 2b in the context of the sectional population of cities using standard deviation analysis, the first part of the hypothesis concerning the uniform distribution of the infrastructure was rejected. In this connection, in total, the overall set of infrastructural benefits observed the following trend: infrastructural facilities are distributed more uniformly over the entire area of cities with fewer than 1 million people, as well as in cities of over 5 million people. For the most part, the megacities show substantial heterogeneity in the distribution of facilities from the centre to the outskirts. A more detailed typological analysis of the benefits showed what, first and foremost, is typical of education facilities; whereas, in terms of health facilities, there is uniformity across all types of cities; in the case of parks, museums and libraries, the unevenness of distribution of facilities increases with the size of the city.

With regard to public satisfaction with the scope and structure of local public goods sector, the analysis revealed a significant dependency of subjective estimates of the extent of the city's infrastructure development. Figure 4 shows how the size of the settlement affects the average estimate of the level of social infrastructural development.

Fig. 4. Dependence of the level of infrastructure development on the size of the locality



Thus, the second part of hypothesis 2b is confirmed.

Regarding the testing of hypothesis 2c, the following results were obtained. The average consumption of infrastructure services with increase in price is reduced when the size of the city increases. Thus the average reduction in demand for small and medium-sized cities is 22-23%, whereas for megacities it is 26% (see Table. 1, with values showing the proportion of the consumption of services from the initial volume, taken as 1). The most substantial demand elasticity dependency relative to city size is observed in relation to museums and sports facilities, which shows a reduction in consumption of 30% -35% with an increase in price (the dependency coefficient was 0.47 and 0.41, respectively). Demand for medical services and transport is less elastic, with the average change of consumption volumes accounting for around 20%. In addition, there is a dependency of elasticity of demand on income, also the most significant for medical and transport services ( $r = 0.54$  and  $r = 0.53$ , respectively).

**Table 1.** Average values of changes in demand for services with a price change of 10%

	<i>Med.</i>	<i>Kindergartens</i>	<i>H.E.</i>	<i>Museums</i>	<i>Sport</i>	<i>Postal Sers.</i>	<i>Transp.</i>	<i>Av. value.</i>
Small	0.94	0.63	0.63	0.81	0.75	0.88	0.81	0.78
Average	0.81	0.86	1.00	0.76	0.56	0.73	0.67	0.77
Large	0.92	0.83	1.00	0.67	0.50	0.67	0.75	0.76
Megacities	0.77	0.78	0.76	0.69	0.65	0.69	0.80	0.74

Data source: "Town Planning Code of the Russian Federation" of 29/12/2004 N 190-FZ (rev. 31/12/2014) (rev. and ext. & in force from 04/01/2015)

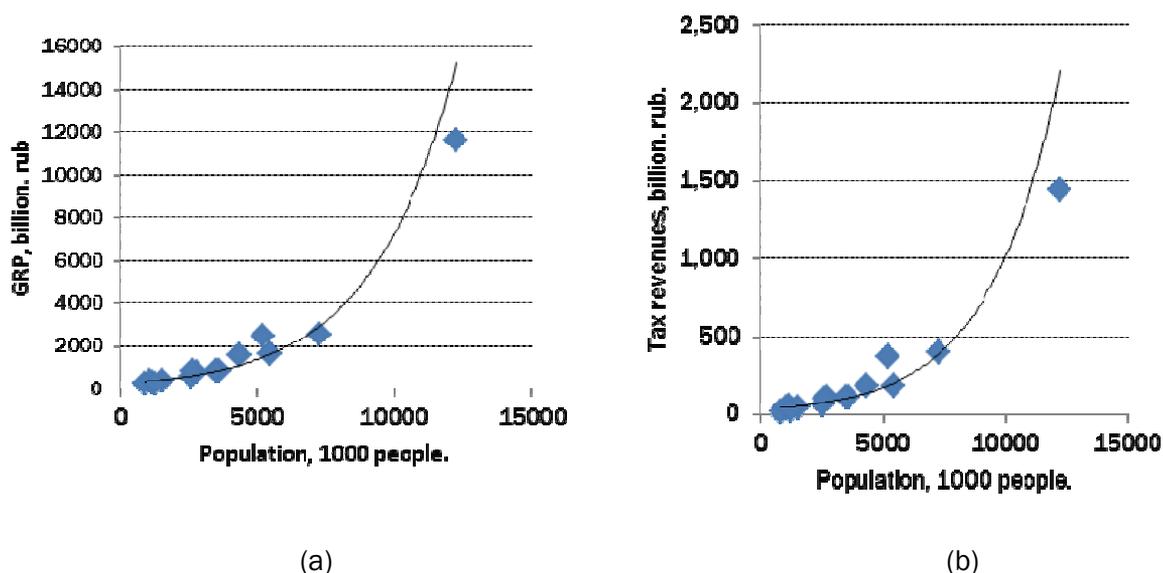
Consequently, hypothesis 2c was confirmed.

Regarding the testing of hypothesis 3, the following results were obtained.

Correlation analysis of population and gross regional product (hypothesis 3a) demonstrated the close relationship of these indicators – the dependency coefficient was 0.91. The dependency between these parameters is exponential, as illustrated in Fig. 5a.

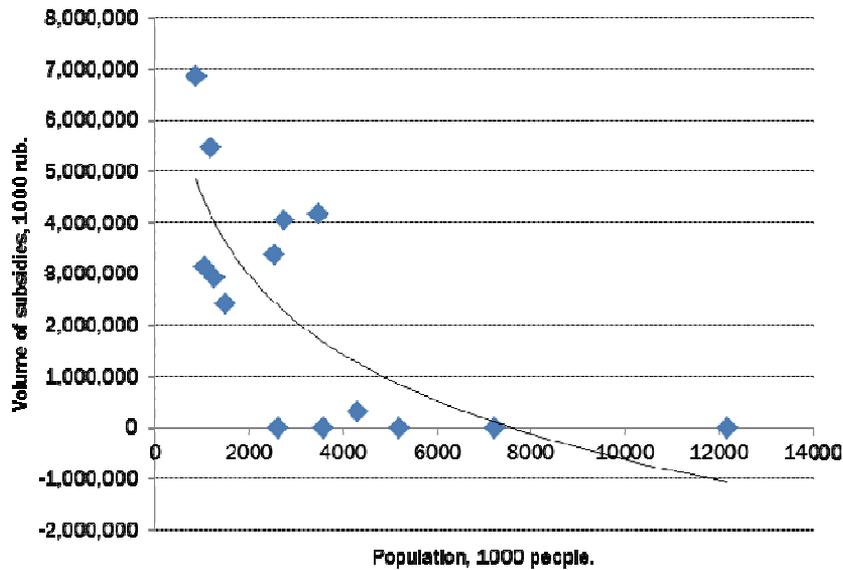
Financial opportunities in relation to the development of infrastructure and social programmes are supported by tax revenues. The analysis of the dependence of the tax revenues of the RF subject on the size of its population showed a close relationship ( $r = 0.92$ ). This dependency is similarly exponential (Fig. 5b).

**Fig. 5.** Dependency between size of population and GRP, volume of tax revenues



The level of financial independence, measured by the volume of subsidies from the federal budget, also showed an association with the size of population; in this respect the dependency was inverse, i.e., with an increase in the size of the territory, its financial dependency is reduced. The dependency coefficient was -0.62. The logarithmic dependency is graphically represented in Fig. 6.

Fig. 6. Relationship between the population and the federal budget subsidy amount

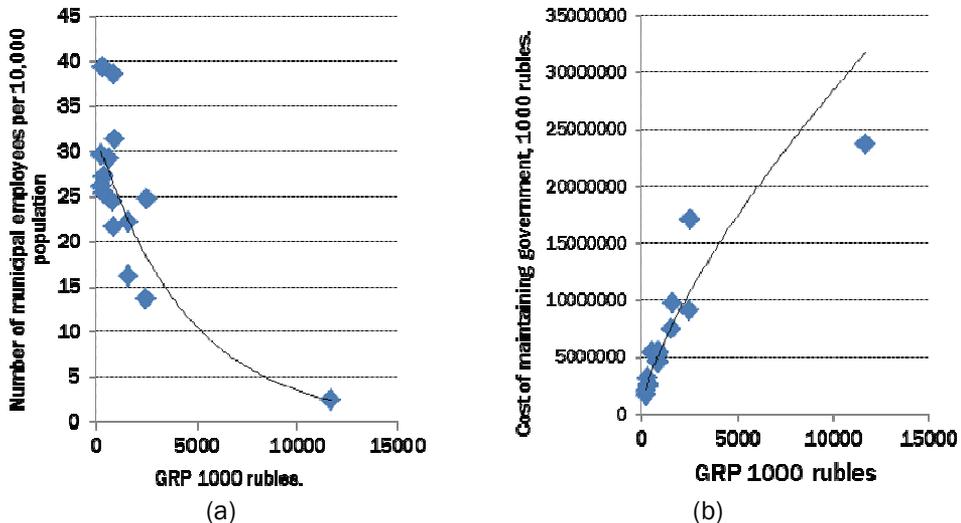


Consequently, a region’s economic well being and financial capacity grow significantly with an increase in its size, whereas the dependence on the federal budget is considerably reduced. The hypothesis is confirmed.

In testing hypothesis 3b, the metric of Gross Regional Product (GRP) was taken as the basic parameter of the economic development of the territory. Correlation analysis showed that the relationship between GRP and the number of municipal employees in the local government of the Russian Federal Subject per 10 thousand inhabitants is inverse and characterised as significant; the dependency coefficient was 0.76 (Fig. 7a).

In this connection, in relation to the consolidated budget of the Russian Federal Subject in terms of the cost of the employees of state and local government authorities, a positive dependency is observed ( $r = 0.88$ ). Although the rate of expenditure growth slows down with an increase GRP (Fig. 7b), in general, it can be noted that a nominal reduction in staff numbers is not accompanied by a corresponding reduction in the financial budgetary burden.

Fig. 7. Relationship between GRP and the indicators for the level of bureaucracy in the region



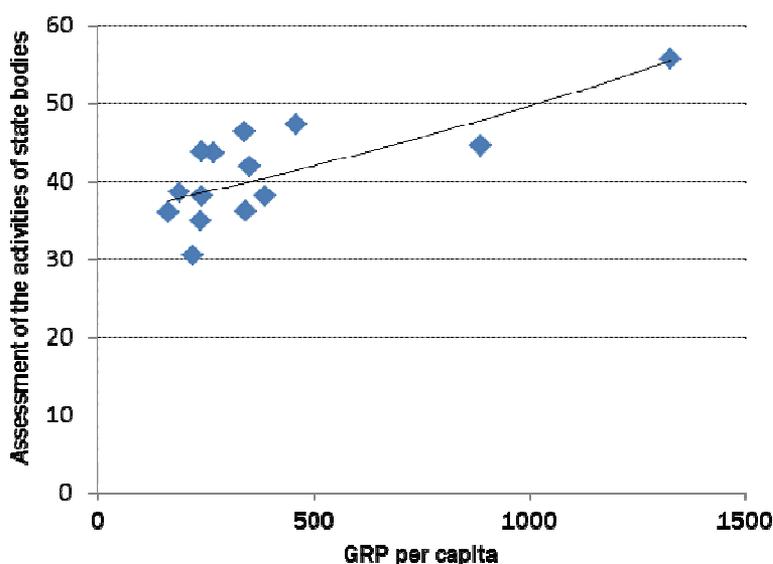
However the indicator available in public satisfaction statistics concerning information transparency of executive authorities of the Russian Federation did not show such a close connection with GRP ( $r = -0.44$ ). Curiously, this relationship is negative, i.e., with growth in economic development; the information openness of the authorities tends to be reduced, although this relationship is not particularly stable.

When subjectively evaluated by respondents, information transparency demonstrated a positive dependency with the number of municipal employees in the local government of the Russian Federal Subject per 10 thousand population ( $r = 0.63$ ). Thus, the territories with the highest levels of bureaucracy tend to disclose information to improve their rating in the eyes of the population – all the more so, since information transparency significantly affects the assessment of public satisfaction with the activities of the executive authority ( $r = 0.64$ ).

Based on the results of the analysis, it should be noted that the hypothesis has not found clear confirmation under contemporary Russian conditions.

In identifying patterns between the economic development of the territory and public satisfaction with the work of executive bodies (hypothesis 3c), two indicators were considered as characterising the satisfaction of the population with the work of state bodies: the population's evaluation of the executive bodies of the Russian Federal Subject (on a 100-point scale) and the satisfaction of the population with the activities of the executive authorities of the Russian Federation (percentage of respondents). Both of these indicators were analysed with respect to their effect on the economic development of the region (GRP and GRP per capita). The results demonstrated a strong dependency of these parameters with the index of GDP per capita ( $r=0.75$  and  $r=0.55$ , respectively), while the connection with GRP was fairly weak. An illustration of the relationship between GDP per capita and the evaluation of government agencies is shown in Fig. 8.

**Fig. 8.** Relationship between GRP per capita and the evaluation of government agencies

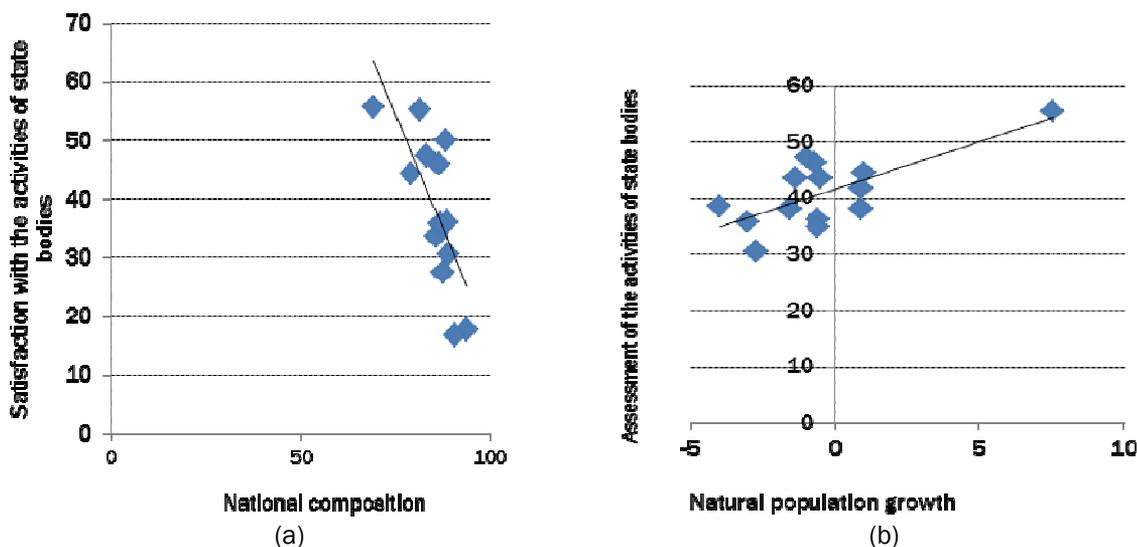


Thus, the level of economic development of the area does have an impact on the satisfaction of the population; nevertheless, the population estimates the result to a greater extent in terms of the development of the region, not in comparison with other regions but in proportion to the increase attributable to each inhabitant of the region. The hypothesis is confirmed. It should be noted that, although the rating of government agencies is rising, in general, the satisfaction of the population with the work of state bodies remains fairly low.

In order to assess the diversity of the population (hypothesis 3d) the ethnic composition of the regions of Russia was analysed against ethnicity criteria. The proportion of ethnic Russians in the total population was chosen as a basic comparative indicator. Correlation analysis showed a significant dependence on this indicator in relation to the index of satisfaction with the activity of state bodies ( $r = 0.75$ ). The dependence is shown graphically in Fig. 9a. Consequently, the hypothesis that the more diverse the ethnic composition of the territory, the lower the evaluation of state bodies is likely to be, is partially confirmed.

The evaluation of the influence of diversity on the age composition was conducted in relation to the birth rate relative to the number of retirees, with generational diversity defined as the proportion of births relative to the proportion of pensioners, as well as serving as an indicator of natural population growth. Of these indicators, only the natural growth rate indicator demonstrated a close relationship; nevertheless, the impact turned out to be the most significant in relation to the indicator of the evaluation of the activities of State bodies ( $r = 0.72$ ). Consequently, age diversity does not have a significant impact on these estimates; however, a positive dynamics of natural population growth leads to improved ratings of the activities of the executive authorities (Fig. 9b).

**Fig. 9.** Dependency of the performance indicators of the activity of state bodies of the national structure and the dynamics of natural population growth



The composition of cultural diversity was assessed by comparing attendance at theatres, museums and libraries as well as the proportion of people with higher education and the number of graduates at various levels against the proportion of those defined as living in poverty. Correlation indices were examined both in relation to the indices themselves and in relation to the weighted values, demonstrating the culture gap between the various population groups. However, neither the principal nor the weighted values were demonstrated to have a significant impact on the ratings of government agencies. Thus, only ethnic diversity can be considered as a factor in determining evaluations of state agencies; the hypothesis was partially confirmed.

As regards the testing of hypothesis 3e concerning the dependence of social spending on the dynamics of population growth, the following results were obtained.

Since additional population growth creates additional demand for public goods, it is logical to assume a positive dynamics between these indicators, which could be sufficient to demonstrate the flexibility of the existing system infrastructure. In order to analyse the population

growth, two indicators were considered – the natural increase (due to the birth rate) and the growth of the population as a consequence of migration. Correlation analysis showed that while the correlation coefficient of natural increase and the share of social spending amounted to 0.71, the indicator of increase (decrease) of the population due to migration did not show a close connection ( $r=-0.25$ ). Thus, there is a strong positive correlation between the rate of natural increase per 1,000 population and the proportion of the total expenditures of the consolidated budget of the Russian Federal Subject that are allocated to social services (Fig. 10); the hypothesis is partially confirmed.

**Fig. 10.** Relationship between the natural increase of the population and the proportion of social spending

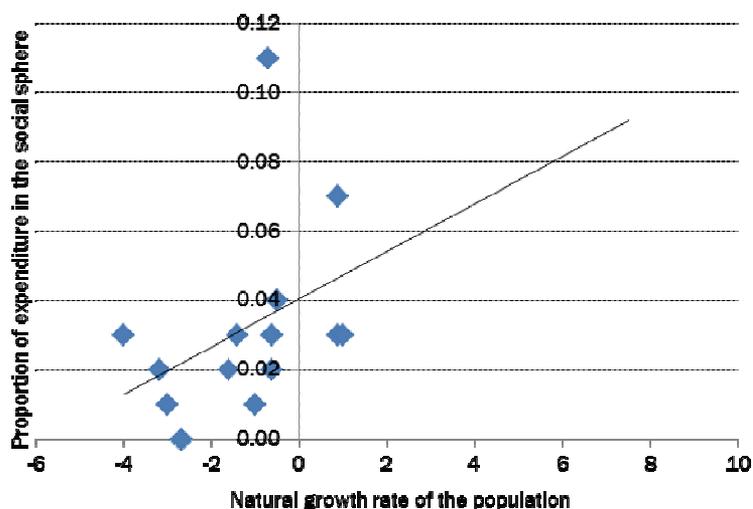


Table 2 presents the results obtained from the second part of the study, which included an analysis of the availability of infrastructure facilities across three regions of Russia – Moscow, Sverdlovsk and Chelyabinsk.

**Table 2.** Territorial accessibility of infrastructure facilities in the Moscow region

<i>Facility</i>	<i>Standard, km</i>	<i>Actual pedestrian access, km</i>	<i>Deviation, times</i>
Kindergartens	0.65	1.68	2.58
Schools	1.25	1.68	1.34
H.E.	Not specified	13.47	
Outpatient clinics	1.25	2.30	1.84
Library	0.65	2.47	3.80
Museums	0.65	10.30	15.85
Parks	0.65	4.62	7.11
Playing fields	0.65	2.94	4.52
Post offices	0.65	1.09	1.68

Data source: Moscow Region Urban Planning Regulations of January 16, 2012 № 24/54

The data in Table 2 show that the availability of infrastructure lags far behind the standard indicators. Pedestrian access to clinics is two times below the regulatory level; preschools – 3 times lower; libraries and sports grounds – 4 times lower; parks – 7 times lower; and museums – 15 times lower. Only for schools and post offices are the actual figures close to the accessibility regulations.

As regards the Sverdlovsk region, health clinics are the facilities for which access is closest to the regulatory norm. Pedestrian access to libraries is two times below the regulatory level; preschools – 3 times lower; schools and pre-school facilities – 4-5 times lower; museums and parks – 6-7 times lower; and universities – more than 10 times lower. (Table 3)

**Table 3.** Territorial accessibility of infrastructure facilities in the Sverdlovsk region

<i>Facility</i>	<i>Standard, km</i>	<i>Actual pedestrian access, km</i>	<i>Deviation, times</i>
Kindergartens	0.4	2.16	5.4
Schools	0.6	2.81	4.7
H.E.	0.7	10.99	15.7
Outpatient clinics	1.0	1.60	1.6
Library	1.1	2.62	2.4
Museums	1.3	7.69	5.9
Parks	1.1	3.50	3.2
Playing fields	0,5	2.70	5.4
Post offices	0.6	1.12	1.9

Data source: Sverdlovsk Region Urban Planning Regulations of 15/03/2010, № 380-PP.

The Chelyabinsk region is characterised by a close compliance between stated norms and the actual availability of infrastructural facilities: thus, access to libraries, sports facilities and post offices is close to the normative values in terms of proximity to the consumer; real values representing access to parks and clinics even exceed those stated in regulations. The results of the analysis of the Chelyabinsk region are presented in Table 4.

**Table 4.** Territorial accessibility of infrastructure facilities in the Chelyabinsk region

<i>Facility</i>	<i>Standard, km</i>	<i>Actual pedestrian access, km</i>	<i>Deviation, times</i>
Kindergartens	0.4	1.2	3
Schools	Not specified	1.7	
H.E.	Not specified	4.13	
Outpatient clinics	1	0.77	0.77
Library	1.1	1.27	1.15
Museums	1.1	1.8	1.64
Parks	2.4375	1.03	0.42
Sports playing fields	1	1.23	1.23
Post offices	0,5	0.7	1.4

Data source: Urban Planning Regulations of the Chelyabinsk Region (draft).

As can be seen from the presented analysis, distinctions are provided not only by indicators of actual access to the infrastructural facilities of the study area but also by those relative to norms established in those areas. Differences in regulatory parameters are a natural reflection of the differentiated approaches taken by the regional authorities towards defining the needs of the population and evaluating the possibilities of satisfying those needs.

## 5. DISCUSSION

The findings of the empirical research and the results of the statistical analysis revealed patterns of spatial accessibility to public benefits that characterise the social infrastructure of urban areas.

The results showed that the level of development of the social infrastructure is highly significant in terms of the overall socio-economic development of the territory. Thus in urban contexts a significant cross-sectional heterogeneity is observed in terms of the quality and availability of infrastructural facilities: significantly more extensive development in relation to the quality of urban growth but at the same time an increase in the heterogeneity of distribution facilities, which greatly reduces their accessibility to the population.

The confirmation of hypothesis 1 concerning the significance of the level of development of the local public sector in relation to social satisfaction in comparison with indicators such as gross regional product, average earnings and the cost per square metre of residential property shows that the level of individual satisfaction grows with the direct satisfaction of their needs, which is ensured not just by the "capacity" to meet social needs but by the actual availability of adequate social infrastructure and spatial accessibility. However, the level of social infrastructure development is often dependent on the level of economic development of the territory as a whole. However, in this case, the data analysis set out to show the dependency of the level of satisfaction of the population on the GRP and average salary, which was not revealed. This is due to the existence of a certain lag between the period of economic growth and the ability of the social infrastructure to meet the needs of society.

The confirmation of hypothesis 2a, concerning the inverse influence of the size of the settlement on accessibility to social infrastructure facilities across the territory, indicates that the capacity of local authorities to provide the required volume of social benefits lags behind the needs of the population. In general, this is due to the high dynamics of development of various spheres of economic activity and the uneven development between different areas of large cities – as well as to the presence of a time lag between changes in the size and needs of the population and the actual manifestation of these requirements in the form of the required number of facilities. In addition to having a more stable population, smaller cities also have a greater potential for operational management of the given sphere due to the smaller number of facilities needing to be accounted for.

Taken together with the results obtained in the course of testing hypothesis 2b concerning the greater uniformity of distribution of infrastructure and the differences in the quality of services with an increase in the size of the city, the results obtained during the testing of the hypothesis pattern 2a show that the quality of infrastructural facilities is more decisive with regard to the social satisfaction of the population than their territorial accessibility.

The confirmation of hypothesis 2c (the smaller the town, the less elastic the demand for local public goods) is due to the limited diversity of the supply of social infrastructure in small towns. It is natural that with an increase in the size of a city the possibilities to refer to other sources, including commercial, to satisfy relevant needs, also increases: this determines a higher elasticity of demand. At the same time, in relation to universities, hospitals and trans-

port, this regularity is absent. Apparently, this is due to the higher specificity of these social facilities and consequently fewer opportunities for the replacement of one facility by another.

Such considerable differences between small and large cities can be explained as follows. In the first instance, the larger the quantity, the greater the financial opportunities for infrastructure development. Major population centres are centres of attraction both for people and financial flows, resulting in a higher flow of tax revenues and greater financial independence. Active economic development also stimulates the activity of the executive power, which has a positive effect on the quality and availability of infrastructure; this is in turn reflected in higher public satisfaction ratings. However, there is a noticeable decline in public satisfaction in the multinational regions due to significant differences between the different nationalities in terms of their needs and the means used to satisfy them. At the same time it is characteristic of Russia that age-related, economic and cultural differences do not exert significant effects. It should also be noted that the territories showing high positive dynamics of natural population growth also demonstrate positive dynamics in terms of pace of development of appropriate infrastructure, which positively characterises the flexibility of local governments.

The results obtained in the second part of the study characterise the overall state of the various types of social benefits existing in the study area. It is possible to draw certain conclusions from the ratio of regulatory and actual values that characterise the spatial distribution and availability of public goods and to base recommendations concerning the optimisation of this process on these conclusions.

For example, an analysis of the social infrastructure of the Moscow region showed that the authorities should pay special attention to the spatial distribution of museums, parks and sports grounds. Concerning the issue of spatial accessibility in the Sverdlovsk region, it is necessary to focus attention on the distribution of kindergartens, schools, museums and sports grounds. In the Chelyabinsk region, actual accessibility is slightly higher than normative, testifying to the high social attractiveness of the area.

In general it should be noted that the identified patterns characterise Russia as comprising a wide variety of economic, geographic and cultural characteristics. The population highly values the importance, availability and quality of the social infrastructure. At the same time, when considering the uneven development of certain sectors, the most important areas from the standpoint of the population include recreation, sports and culture. There are significant size-related differences: in large cities, there is a much more developed infrastructure, which constitutes the centre of attraction of migratory flows. However, it naturally occurs that the territorial availability of infrastructure is reduced with the size of the city and there is inequality in the distribution of objects from the centre to the outskirts. This is particularly evident in relation to parks, museums, libraries and universities; to a lesser extent, this also applies to kindergartens, post offices and sports grounds. Furthermore, with an increase in the size of the city, infrastructural elasticity of demand will also increase due to the wide variety of infrastructural facilities.

The comparative analysis allows us to identify the primary needs of the region in terms of improving the quality of services in the social, cultural and general spheres – as well as in the terms of the provision of recreational facilities. In general, the given data in the three regions show insufficient provision of basic facilities (kindergartens, secondary schools, health care facilities, recreational areas and sports facilities), allowing us to identify the main socio-economic problems of the regions and to propose recommended directions for their development.

## 6. CONCLUSION

In order to analyse the spatial accessibility of public goods that form the social infrastructure of urban areas, the present study identifies the influence of various factors on the level of social satisfaction of the population, leading to the following conclusions.

Firstly, the level of development of the local public sector is proportional to the level of social satisfaction of the population.

Secondly, there are significant differences between territories in terms of the allocation of infrastructural facilities. Through the course of the study it was revealed that the size of the settlement (in terms of population) is inversely proportional to the availability of social infrastructural facilities; that the populations of smaller towns place less demand on the volume and structure of the local public goods sector than the populations of larger towns; and that elasticity of demand for local public goods depends on the size of the locality.

Thirdly, in terms of the characteristics of the development of infrastructure in the territories, distinguished both by differences in socio-demographic indicators and by differences in financial resources and bureaucratic mechanisms, it was shown that the population of the territory determines the financial capacity for the provision of public goods and that the level of economic development influences the extent of the bureaucratic burden, the transparency of government and the level of public satisfaction with the work of executive authorities.

The practical significance of the study lies in the possibility of using the results to develop recommendations to representatives of public authorities regarding the social infrastructural development of municipalities at the same time as increasing the social attractiveness of the territories in question.

In terms of the further development of the identified issues, it is anticipated that the features of a sustainable institutional framework of public goods will be defined alongside the development of a methodology for assessing the cost-effectiveness of the optimal structure of public goods.

## Acknowledgements

*This study received support from the Russian Foundation for Basic Research, project N 14-06-00024. The authors would also like to express their gratitude to the editor in chief and to the anonymous reviewers for the peer review.*

## REFERENCES

- Derycke, P.H. and Gilbert G. (1988), "Economiepublique locale", Economica, Paris.
- Galbraith, J. K. (1973), "Economics and the public purpose", Houghton Mifflin, Boston, 29-37.
- Henderson, J.V. (1977), "Economic Theory and the Cities", Academic Press, NY.
- "Jean Tirole: Market Power and Regulation", compiled by the Economic Sciences Prize Committee of the Royal Swedish Academy of Science,  
[http://www.nobelprize.org/nobel\\_prizes/economic-sciences/laureates/2014/advanced-economicsciences2014.pdf](http://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/2014/advanced-economicsciences2014.pdf)
- Layard, R. (2006), "Happiness and Public Policy: a Challenge to the Profession", The Economic Journal, 116 (March), 24-33.
- Margolis, H. (1982), "Selfishness, Altruism and Rationality: A Theory of Social Choice", Chicago, London.
- Musgrave, R. (1959), "The Theory of Public Finance", N.Y.-London.
- Nesbitt H. and Ziller A. (2001), "Social Sustainability and the Planning Comfort Zone", RAPI Conference Papers.
- Olson, M. (1965), "The Logic of Collective Action. Public Goods and the Theory of Groups". Harvard University Press, Cambridge, Massachusetts, London.
- Popov, E. (2014), "Transaction Estimation of Institutions", *Advances in Economics and Business*, Vol. 2, No 1, 58-64.

- Popov E.V. and Katz I.S. (2014), "Instituzioni del settore beni pubblici nel mondo e Russia", *Italian Science Review*, Vol. 18, Issue 9, 180-183.
- Rabin, M. (2003), "The Nobel Memorial Prize for Daniel Kahneman", *Scand. J. of Economics*, 105 (2), 157-180
- Samuelson, P. (1954), "The Pure Theory of Public Expenditure", *Review of Economics and Statistics*, Vol. 36, issue 4, 387-389.