# Integrated Estimation of Territory Social and Economic Infrastructure: Experimental Modeling

**Angelina N.Ilchenko**
Doctor of Economics
Honoured Scientist of Russian Federation
Professor, School of Management
Finance and Information Systems
Ivanovo State University of Chemistry and Technology
7, Sheremetev Avenue, Ivanovo, 153000, Russia
&
Doctor
Professor
School of Mathematics and Computer Science
Wuhan Textile University
1, Sunshine Avenue, Jiangxia District, Wuhan
Hubei province, 430200, China

## Abstract

*The major problem of the state social and economic policy for the countries with transitional economics is smoothing of territories' (regions') development inequality and population life quality leveling. This problem is solved by development of lagging regions' infrastructure. The state chooses investment projects, in the conditions of financial resources' limitation and lack of a complex methodology of estimation of different territories' social and economic infrastructure condition. In the article the statistical problem of measurability of condition of social and economic infrastructure (SEI) of the territory (region) is analyzed. The author offers integrated statistic indicator – the Index of Development of Social and Economic Infrastructure (IDSEI). IDSEI allows classifying and ranking of the territories for the purpose of the state regional policy realization: that is investment appeal and population life quality leveling. It is enough of the national state statistics official data for IDSEI calculation. In the article the results of experimental modeling (Russia regions ranking on IDSEI value fulfilled in 2012-2013) are presented. Applicability of the IDSEI method for regional economy management of "overtaking development" countries is proved.*

**Key Words:** regional economy; infrastructure; integrated indicator; ranking of the territories

**JEL-Code:** H54; O18; R58; C02

## *1. Introduction*

In the 21st century postindustrial society social and economic development of any country is defined by its population life quality. Life high quality in the countries of Western Europe is the reason of powerful migratory movements of the population from Asia, Africa and Eastern Europe countries including illegal refugees. Excessive migration has a negative effect on both parties of this process:

- The host countries cannot provide all migrants with social services, workplaces and housing habitation;
- The countries with "poor" economy lose the most able-bodied, economically active people. The country loses stimulus of economic growth, investment appeal. Local population poverty level goes down even more strongly.

Quality of life is territory (region) multicriterin characteristics; it is investment and migratory appeal. The determining influence on population quality of life has territory infrastructure condition: the more developed infrastructure is, the more attractive is the territory to business and for the population.

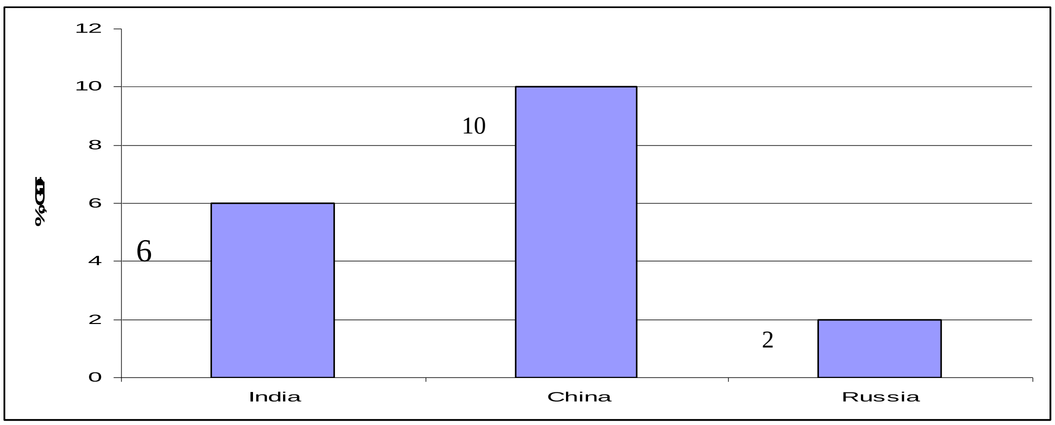
For developing countries (such as Asia, Africa, and the Eastern Europe) the basis of state policy of quality of life improvement is infrastructure development. Today the economic science has already defined the mechanism of interaction of infrastructure and quality of life.

In the conditions of market economy infrastructural processes provide business entities' logistic interaction, movement of goods and services, financial streams, labour market functioning, scientific and technical progress development. Infrastructural investments have cumulative synergetic effect but their influence on economic growth of territory (country) has a long lag of delay (3-5 years).

Modeling of interrelation between infrastructural investments and gross national product by example of 52 world countries from 1980 to 2002 made by Kondratyev (2010) showed:
It is necessary to invest financial resources in electrical supply and telecommunication system at 0.2 % and 0.7 % of gross national product rate accordingly for gross national product rate increase maintenance at 3.6 % level in a year. And for annual 6% of economy growth rates achievement doubling of these indicators is being required.

For maintenance of long-term economic growth developing countries should distract from current expenses considerable financial assets for infrastructural investments, both of industrial and social spheres. For example, since 2000th China invests in infrastructure 8-10 % of gross national product (GNP), India – of nearly 6 %, Russia – of nearly 2 %

**Figure1. Investments in Infrastructure during the Year (Percent from Gross Domestic Product) for the Period from 2001 To 2010**



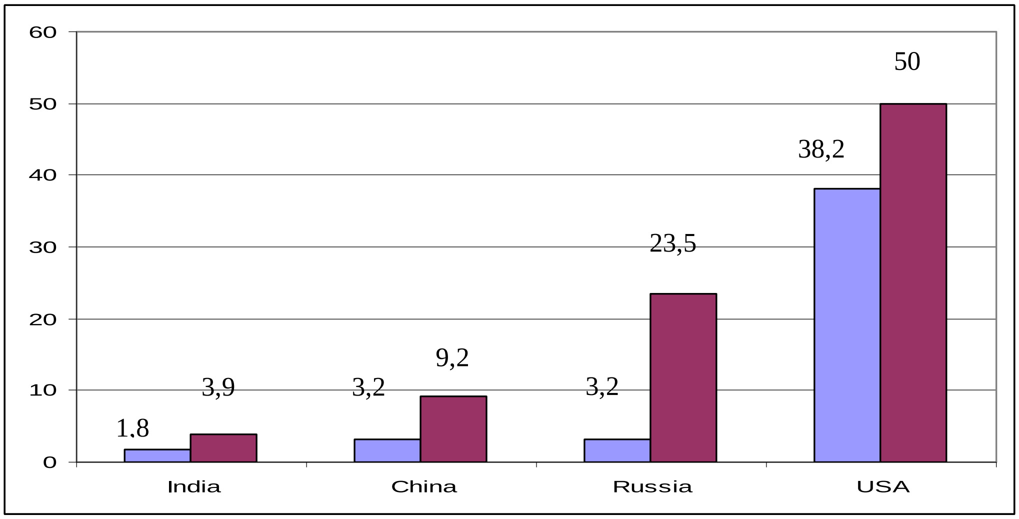

**Source:** the author's elaboration on the basis of Russtat materials (2010)

Against the background of financial and economic crisis many countries including the USA and China have accepted the ambitious programs of infrastructure development and modernization (for example, look at Zotin (2012), Wang Wenli (2012), Kondratyev (2010). As international experts estimated investment planned volumes into world countries infrastructure during the period from 2010 to 2020 will make (billion dollars annually): EU countries - 305, China - 200, other Asia countries – 200, North America - 180, Middle East – 56, the countries of the former USSR – 56, Latin America – 45, Africa - 10.

The government infrastructure management in the countries with transitional economics and widespread territories is attended by an internal problem of separate regions' development inequality. It is typical, for example, of Russia, India, and China. The population living standard in "forward" and "backward" regions differs in dozens of times (Russtat, 2012, 2013) what leads to the same migratory problems as in interstate relations. In the regional economy theory infrastructural investments are considered as the major instrument of creation of conditions for smoothing of inequality in branches' and territories' development. Investments into region infrastructure are an ideal way of redistribution of resources and labour from stagnation economy sectors to the branches capable of long-term economic growth providing. All know estimation of Mc Kinsey (2009) that each dollar spent for infrastructural projects causes multiplicative effect at the rate of 1,59 dollars but only over the years.

Investment risks lay down on the state budget even under the condition of state and private partnership. It is clearly visible from the figure 2.

**Figure2. GDP Growth per Capita, Thousands of Dollars for the Period from 2003 To 2012**




**Source:** the author's elaboration

It is obvious that planning of the state infrastructural investments must be based: on the analysis of priority of one or other projects and on region ranking on infrastructure development level. Each country working out the strategy of infrastructure development and modernization is faced with four main problems: a priority choice, estimation of financial possibilities, a choice of development optimum model and proportions of state and private partnership. The solving of mentioned problems strikes on a problem of quantitative estimation of infrastructure development level which has now no single-valued solution.

## *2. A Problem of Quantitative Measurement of Infrastructure*

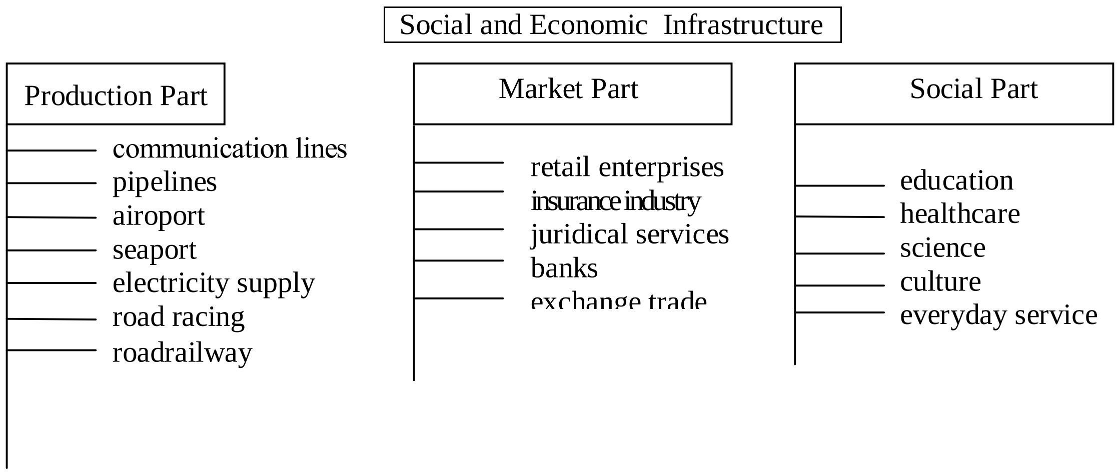
For quantitative measuring of infrastructure condition it is necessary to define its structure (elements) and a set of indicators for measurement of these elements. However, at present time the social and economic infrastructure concept is seemed to be difficult and inconsistent in the scientific environment. In the modern economic literature there is no clear separation of infrastructure kinds and pertaining to them fields of activity. There is no classification of territories in connection with economic entity of national economy different level (look at: Korol, 2009).

Numerous publications of last years show the attention of the authors to infrastructure separate elements and to concrete problems of investment projects' government management (Kularathe, 2006, and also the materials of Urban Land Institute, 2010). Nevertheless, when generalizing available definitions it is possible to formulate the substantial sense of this concept.

INFRASTRUCTURE is "the arrangement" of the territory; it is a comfortable environment for the population and for business. Traditionally in the economic literature three infrastructures are marked out. That are: production (communication lines, pipelines, airports and seaports, transmission facilities, highways and rail transport); market (trade enterprises, stock exchanges, banks, insurance companies) and social (education, public health services, science and culture, household maintenance)

It is necessary to recognize that differentiation has indistinctly expressed character as some services (and their manufacturers) can belong at once to several kinds of an infrastructure. If to unite all the variety of infrastructure objects we will receive the following definition.

**Figure 3: Infrastructure elements classification**




**Source:** the author's elaboration

SOCIAL AND ECONOMIC INFRASTRUCTURE (SEI) is the complex of various enterprises which create the general conditions for functioning of different kinds of activity and for comfortable people residence on the territory. SEI functioning has multiple-valued character: on the one hand it is material production service, on the other it is manpower resources' reproduction (also as material production factor). Besides, SEI ensures environmental standards. Therefore, SEI unites in itself all of the three infrastructure kinds but only in the aspect of public importance of services that is within government management authorities.

The analysis of territory needs in infrastructure modernization and investment projects' priority alignment assume classification of territories (regions) by SEI development level in consideration with the level of quality of life of the population (QLP). For the purpose of territory classification carrying out the necessary instrument there should be the integrated quantitative indicator resting upon official statistics data published annually in all countries. Further we will analyze scientific publications on this problem.

For QLP level estimation the United Nations experts in the countries and regions apply the methodology of calculation of index of development of human potential (IDHP). For example, look at Zvyagintseva and Zhukovsky, 2012. IDHP varies from 0 to 1, and for more IDHP value there corresponds higher QLP level what allows to rank territories objectively. For the methods of SEI measurement there is another situation.

Territory classification by the level of infrastructure development has no common methodology on the strength of the objective reasons the main of which is the blurriness of the "social and economic" infrastructure concept as itself. This implies factorial uncertainty which by- turn involves the uncertainty of classification. The problem consists in the fact that the current data of various SEI enterprises are included in different information bases (of branches or spheres of activity) which contain the incommensurable quantities. The official state statistics cannot compare a condition of different infrastructure objects because their indicators are various. For example, it is the work of schools and power stations, the work of hospitals and buses, the work of underground railway and water pipes etc. The single integrated indicator of SEI measurement in publications on economy is absent but there are separate local researches.

As Kondratyev, 2010 writes, in the modern economic literature there are two main approaches to measurement of infrastructure objects: physical (natural) and financial (cost). Financial indicators measure the accumulated investments or cumulative capital in the concrete infrastructure branches (for example, the cost of roads, of school buildings, of power networks). The financial approach is also applied to estimation of "to date" investment projects' costs.

At the same time the level of territory SEI development reached earlier and effectiveness of its functioning (in terms of QLP increasing) are not considered. From the Russian researches we will note two works (Zvyagintseva and Zhukovsky, 2012) where the authors apply a financial estimation of retail sale volumes of all enterprises of the territory or estimation of cost of the basic production assets of SEI enterprises. Calculation is carried out in current prices; therefore we will notice that the method application is possible only within national borders. The natural indicators measure a wide spectrum of characteristics: the extension of hard-surface roads, the number of school classes or cargo ports' capacity.

It is obvious that natural indicators of activity of the enterprises from various branches are incommensurable. As it is almost impossible to construct a single natural index (according to Kondratyev, 2010, and other economists) so in practice natural indicators are used only during the research of infrastructure separate segments.

Both methodical approaches (financial and natural) suffer from limitedness as they do not reflect the important humanitarian essence of social and economic infrastructure that is manpower resources reproduction. It is obvious that territory competitive infrastructural advantages include both social advantages to the population, and investment appeal to business.

Let's sum up the discussion about a problem of infrastructure quantitative measurement. As the single natural index covering various kinds of infrastructure is almost impossible to construct and cost estimations suffer from limitedness and regional subjectivity so the problem of a commensurability of territory infrastructure levels remains actual. It is fair as for the countries of “overtaking development” and as for many Russian regions.

The method of social and economic infrastructure level measurement offered by us unites social and demographic and production and territorial components, i.e. quality of life of the population and business appeal of territory in one integrated index. The method of measurement of the Index of Development of Social and Economic Infrastructure (IDSEI) uses the national statistics official data published annually in the majority of countries. At the same time the commensurability of natural and cost indexes is provided by transition to relative estimations (indexes).

We will stop shortly on the essence of IDSEI calculation methodology.

### *3. Algorithm of Calculation of the Index of Development of the Social and Economic Infrastructure (IDSEI)*

For calculation algorithm substantiation the following assumptions are accepted:

- IDSEI includes two components: social and demographic and production and territorial, $I_{soc}$ and $I_{ter}$ accordingly;
- $I_{soc}$ index structure includes four components (indicators per capita): economic possibilities of the person ($I_p$ through gross national product level); economic activity of business ($I_k$ through a population employment level); daily living conditions: public health services and education (doctors and teachers supply) - $I_c$ and also living conditions (sq.m. on one person)- $I_h$;
- $I_{ter}$ index structure includes three components (indicators on 1000 sq. km of the territory): transport network development $I_{tr}$; fresh (drinking) water supply $I_w$; ecological cleanliness of environment (through the impurity level)- $I_z$;
- informational support of all calculations is based on the official data of national statistics and also on recommendations of the United Nations experts about application of the minimum quality standards of life;
- IDSEI size in the range from 0 to 1 must reflect region “appeal” to the population and business as a whole because SEI development level is the important indicator of enterprise activity of the population and of the investment climate of the territory.

With a glance of accepted assumptions and designations the algorithm of IDSEI calculation has the following form

$$IDSEI = 1/3\, I_{soc} + 2/3\, I_{ter}\,, \quad (1)$$

Where weight coefficients reflect the importance $I_{soc}$ and $I_{ter}$ components

$$I_{soc} = 1/4(I_p + I_k + I_c + I_h)\,, \quad (2)$$

$$I_{ter} = 1/3(I_{tr} + I_z + I_w)\,, \quad (3)$$

Here: the components (local indexes) are calculated on the basis of the region actual data value and of measurement data recommended by the United Nations experts for all countries. For example:

$$I_p = \frac{\log 10 P_{fix} - \log 10 P_{\min}}{\log 10 P_{\max} - \log 10 P_{\min}} \;, \qquad (4$$

where $P_{\max} = 4000, P_{\min} = 100$ (US dollars);

$P_{fix}$ - gross national product level per capita fixed in the region.

Calculation of $I_k \; I_c \; I_h$ private indexes is carried out on the basis of the following general formula:

$$I = \frac{P_{fix} - P_{\min}}{P_{\max} - P_{\min}}, \qquad (5)$$

where $P_{fix}$ - actual indicator value in the region;

$P_{\max}, P_{\min}$ - the maximum and the minimum value among all researched regions accordingly.

We estimate $I_{tr}$ indicator on the basis of hard-surface road extension - $T_{ra}$ and also of railway lines extension - $T_{rb}$ (km on 1000 sq. km of the territory):

$$I_{tr} = 1/2\left(\frac{T_{ra_{fix}} - T_{ra_{\min}}}{T_{ra_{\max}} - T_{ra_{\min}}} + \frac{T_{rb_{fix}} - T_{rb_{\min}}}{T_{rb_{\max}} - T_{rb_{\min}}}\right), \qquad (6)$$

where: the maximum, the minimum and the fixed values of indicators are defined similar to the formula (5).

The ecological potential of environment ($I_z$) is calculated on the basis of the annual data published: about the quantity of industrial poison emissions in the atmosphere - $Z1$, and also about volumes of crude waste water - $Z2$

$$I_z = 1 - 1/2\left(\frac{Z1_{fix} - Z1_{\min}}{Z1_{\max} - Z1_{\min}} + \frac{Z2_{fix} - Z2_{\min}}{Z2_{\max} - Z2_{\min}}\right), \qquad (7)$$

Here we use the mode as in the formula (6) but we will subtract the received sum from 1 in order to keep a “positive”" orientation of all private indexes.

The $I_w$ index is calculated on the basis of climatic and geographical territory position: $W$ annual drain from the river and lake pools (cubic km on 1000 sq. km of the territory):

$$I_w = \frac{W_{fix} - W_{\min}}{W_{\max} - W_{\min}} \;, \qquad (8)$$

After substitution of local component calculated value in the formula (1) we will receive IDSEI size in the range from 0 to 1. At the same time the higher index value corresponds to the higher level of SEI region (territory) development.

**Table 1: Enumeration of Statistical Indicators for Russian Regions' IDSEI Determination**

| Indication | Denomination of special indices according to professor A. Ilchenko methodology | Statistical indicators used for indices determination |
|---|---|---|
| **1** | **2** | **3** |
| Social and demografic component ( $I_{soc}$ ) | | |
| $I_P$ | Index of personality economic possibilities | Per capita GRP level (disregarding purchase power parity),roubles |
| $I_C$ | Index of population supply by medical and educational services $I_C = 1/2(I_{C1} + I_{C2})$ | State and municipal comprehensive school teachers quantity (disregarding evening comprehensive schools), per thousand people |
| | | All specialties doctors quantity, per thousand people |
| $I_h$ | Index of population supply by minimally well-appointed houses | Total living area shared on average of one inhabitant, square meters |
| $I_k$ | Index of business economic activity | Average annual quantity of economically occupied, per thousand of economically active population |
| Industrial component ( $I_{ter}$ ) | | |
| $I_{tr}$ | Index of transport network development | Hard surface public road extension, kilometers per thousand square kilometers |
| | | Railway main line extension, kilometers per thousand square kilometers |
| $I_w$ | Index of fresh water supply | The volume of fresh water use, cubic metres per one square kilometer of territory |
| $I_z$ | Index of environmental clearness $I_z = 1/2(I_{Z1} + I_{Z2})$ | Emission, tone per one square kilometer of territory |
| | | Waste discharge in superficial water, tone per one square kilometer of territory |
| **Total: Integral index of development of social and economic infrastructure (IDSEI)** | | |

**Source:** the authors' elaboration

The author's hypothesis: «IDSEI can be used for territory ranking, for revelation of "forward" and "backward" regions» - demands practical checking with the use of annual official data of national statistics.

## *4. IDSEI use for Monitoring of Russia Regions (2009-2011)*

For hypothesis checking special research on an example of 18 regions of the Central federal district (CFD) of Russia (2009 - 2011) was fulfilled. Data of Federal Agency of the state statistics of the Russian Federation was applied for calculations (Russtat, 2012, 2013). At the first stage the ranking of CFD regions on IDSEI level was carried out; and then at the second stage the result received with the results of other methodologies of investment appeal and territory economic development level estimation was compared.

**Table 2: Ranking of CFD Regions for 2011**

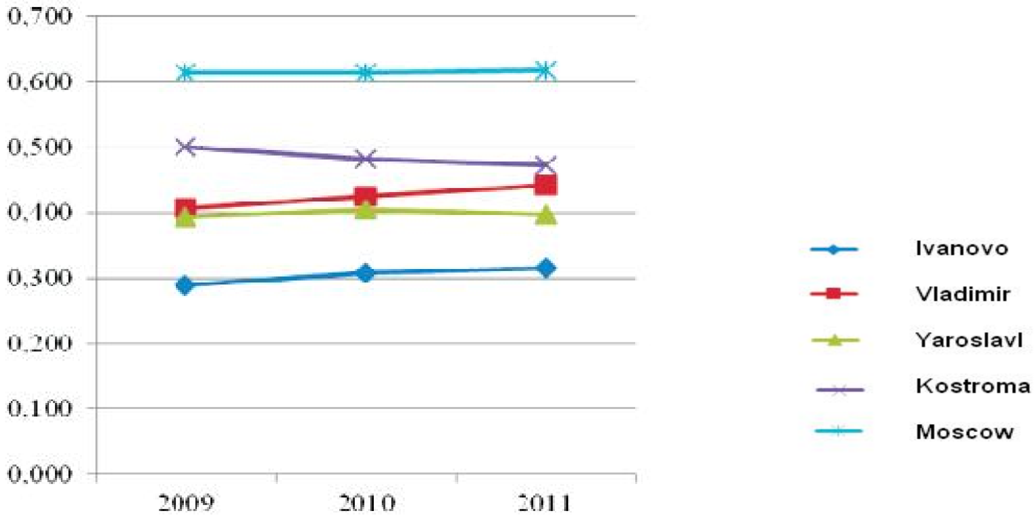
| № | Region | IDSEI | $I_{soc}$ | $I_p$ | $I_c$ | $I_h$ | $I_k$ | $I_{ter}$ | $I_{tr}$ | $I_z$ | $I_w$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Moscow city | **0,65** | 0,63 | 1,00 | 0,50 | 0,00 | 1,00 | 0,67 | 1,00 | 0,00 | 1,000 |
| 2. | Moscow | **0,58** | 0,40 | 0,49 | 0,12 | 1,00 | 0,00 | 0,66 | 1,00 | 0,95 | 0,041 |
| 3. | Kursk | **0,53** | 0,66 | 0,28 | 0,76 | 0,76 | 0,83 | 0,46 | 0,39 | 0,99 | 0,004 |
| 4. | Belgorod | **0,45** | 0,51 | 0,52 | 0,32 | 0,70 | 0,50 | 0,42 | 0,30 | 0,96 | 0,004 |
| 5. | Orel | **0,45** | 0,49 | 0,17 | 0,50 | 0,61 | 0,72 | 0,46 | 0,26 | 0,99 | 0,000 |
| 6. | Kaluga | **0,44** | 0,41 | 0,33 | 0,26 | 0,65 | 0,39 | 0,40 | 0,38 | 1,00 | 0,001 |
| 7. | Smolensk | **0,44** | 0,52 | 0,22 | 0,63 | 0,65 | 0,59 | 0,40 | 0,21 | 0,99 | 0,000 |
| 8. | Vladimir | **0,44** | 0,37 | 0,20 | 0,14 | 0,62 | 0,54 | 0,47 | 0,41 | 0,99 | 0,002 |
| 9. | Tula | **0,44** | 0,42 | 0,19 | 0,15 | 0,63 | 0,72 | 0,44 | 0,39 | 0,93 | 0,006 |
| 10. | Lipetsk | **0,43** | 0,47 | 0,36 | 0,30 | 0,69 | 0,51 | 0,42 | 0,37 | 0,87 | 0,003 |
| 11. | Voronezh | **0,43** | 0,48 | 0,24 | 0,42 | 0,69 | 0,60 | 0,41 | 0,22 | 0,99 | 0,004 |
| 12. | Ryazan | **0,42** | 0,45 | 0,21 | 0,46 | 0,70 | 0,42 | 0,41 | 0,24 | 0,97 | 0,001 |
| 13. | Yaroslavl | **0,41** | 0,47 | 0,32 | 0,52 | 0,54 | 0,50 | 0,38 | 0,17 | 0,98 | 0,003 |
| 14. | Tverskaya | **0,41** | 0,43 | 0,23 | 0,42 | 0,87 | 0,19 | 0,40 | 0,19 | 1,00 | 0,011 |
| 15. | Bryansk | **0,40** | 0,36 | 0,08 | 0,37 | 0,63 | 0,35 | 0,43 | 0,28 | 0,99 | 0,000 |
| 16. | Tambov | **0,40** | 0,40 | 0,17 | 0,27 | 0,54 | 0,60 | 0,40 | 0,20 | 0,99 | 0,000 |
| 17. | Ivanovo | **0,36** | 0,30 | 0,00 | 0,30 | 0,50 | 0,39 | 0,39 | 0,19 | 0,99 | 0,003 |
| 18. | Kostroma | **0,34** | 0,35 | 0,17 | 0,28 | 0,61 | 0,35 | 0,34 | 0,00 | 1,00 | 0,021 |

**Source:** article: Ivanova, 2013.

Table 2 shows IDSEI index and private indexes (IDSEI components) values for 2011. Here three groups of regions on SEI development level are clearly allocated:

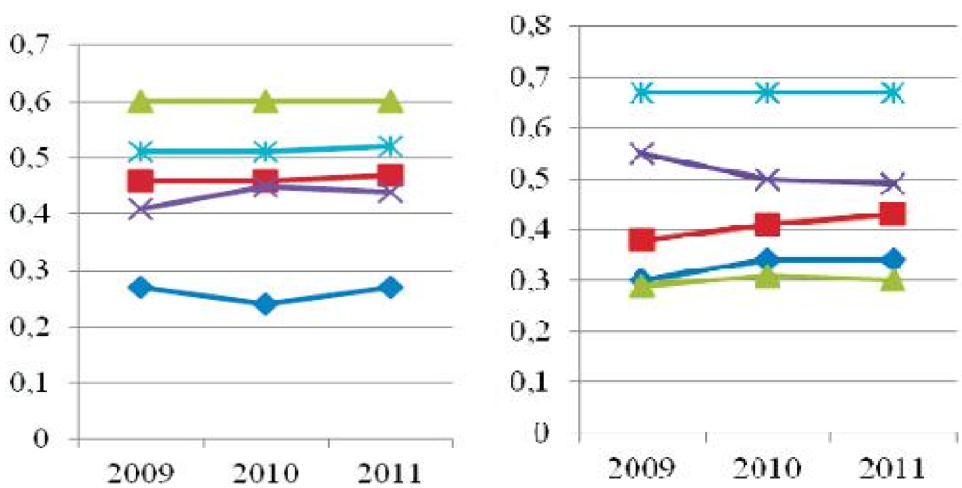
- High level of development (Moscow, Moscow region, Kursk region): 0,5 <IDSEI≤0,65;
- Low level of development (Bryansk, Tambov, Ivanovo, Kostroma regions): IDSEI≤0,40;
- The average level (11 regions): 0,41 ≤ IDSEI <0,45

**Figure 4: Dynamics of Region Social and Economic Infrastructure Development Level Index**




Ivanova (2013) in the article analyzed in details a rating of the regions with «a low level of development». For example, on the figure 4 we see: the Ivanovo region is only on 17th place for IDSEI level. However, this area has $I_{tr}$ industrial infrastructure development level above the neighbouring Yaroslavl region (a 13th rating), due to the best condition of transport network and the best ecological situation.

**Figure 5: Dynamics of change of private IDSEI indexes: a- $I_{soc}$ ; b- $I_{ter}$**




a b

**Table 3: IDSEI Comparison with the Other Methodologies of Region Investment Appeal and Social and Economic Development Level Estimation (By the Example of CFD Regions for 2011)**

| № | Region | IDSEI | "RIA Analytics" rating of social and economic situation | "Expert RA" investment potential ranking |
|---|---|---|---|---|
| 1. | Moscow city | 0,65 | 82,16 | 1 |
| 2. | Moscow | 0,58 | 64,84 | 3 |
| 3. | Kursk | 0,53 | 41,64 | 36 |
| 4. | Belgorod | 0,45 | 58,04 | 19 |
| 5. | Orel | 0,45 | 33,93 | 63 |
| 6. | Kaluga | 0,44 | 47,52 | 39 |
| 7. | Smolensk | 0,44 | 34,92 | 50 |
| 8. | Vladimir | 0,44 | 44,65 | 38 |
| 9. | Tula | 0,44 | 46,59 | 32 |
| 10. | Lipetsk | 0,43 | 49,41 | 42 |
| 11. | Voronezh | 0,43 | 46,07 | 23 |
| 12. | Ryazan | 0,42 | 37,07 | 47 |
| 13. | Yaroslavl | 0,41 | 43,61 | 37 |
| 14. | Tverskaya | 0,41 | 36,73 | 41 |
| 15. | Bryansk | 0,40 | 34,3 | 43 |
| 16. | Tambov | 0,40 | 39,03 | 57 |
| 17. | Ivanovo | 0,36 | 27,82 | 64 |
| 18. | Kostroma | 0,34 | 24,93 | 71 |

**Source:** article: Ivanova, 2013

Table 3 gives the comparative analysis of the results of IDSEI calculation and ratings of the same regions by two other methodologies: the methodologies of «RA Expert» rating agency and «RIA Analytics» centre of economic researches. (These methodologies do not consider social and demographic aspects). From the table 3 we see that rating positions of the regions are different, but obvious contradictions are absent.

So, it is possible to make two conclusions:

1) IDSEI methodology offered by us is effective, authentic and universal;
2) The methodology offered by us allows to make the additional detailed analysis of SEI condition on the basis of local indicators (IDSEI components).

## *5. The Conclusions*

The analysis and forecasting of social and economic infrastructure development is an actual problem of regional government especially for developing countries with transitional economics.

Nowadays the economic science has no unique methodology of SEI development estimation and territory ranking both in each country and in the different countries. The official state statistics cannot compare a condition of different infrastructure objects because their indicators are incommensurable.

The problem of quantitative SEI measurement on the basis of national statistics data can be solved with use of IDSEI integrated indicator - the Index of development of a social and economic infrastructure.

The experimental modeling executed on the limited data volume shown the possibility of IDSEI method use for regional planning of infrastructural investments.

The further expansion of experimental modeling scale will help to clear the possibilities and the restrictions of IDSEI applicability sphere, to specify its parameters and structure and also to expand knowledge of directions of applied IDSEI use in state and regional government.

### *References*

Infrastructure 2010. Investment Imperative (2010). – Wash. D.C.: Urban Land Institute and Ernst Young.

Ivanova, Nina A. (2013). «Social and Economic Infrastructure Development Level as RF Regions Investment Attractiveness Factor», Modern High Technologies. Regional Application. 3(35), 39-44.

Kondratyev, Vladimir B. (2010). «An Infrastructure as the Factor of Economic Growth». Available at http://www.perspektivy.info, accessed November 11 2012.

Korol, T.A. (2009). «To a Question on Classification of Objects of an Infrastructure». Dialogues about a Science,3.

Kularathe C. (2006) «Economic Infrastructure Impacts on Economic Growth». University of Cape Town. School of Economics Staff Seminar Series.

Russtat (2010). The Statistical Information. «Russia and the World Countries».

Russtat (2012). The Statistical Information. «The Russia Regions. The Social and Economic Indicators».

Russtat (2013). The Statistical Information. «The Social and Economic Indicators of Poverty in 2009-2012».

The right way to invest in infrastructure. (2009) – Mc Kinsey & Company, Michael Lind. Quarterly Review, September.

Wang, Wenli (2012). «The Discussion of the Effect of the Infrastructure Investment to the Regional Economical Growth». Gansu Social Economy, 99-103.

Zvyagintseva, Olga P. and Zhukovsky, Irina F. (2012). «Competitiveness of a Standard of Living in Regions of Russia and EU», Modern Competition. 1(31), 104-110.

Zotin, Alexander (2012). «China: Growth Limits». Available at http://www.chinapro.ru/rubrics/2/7817/, accessed December 01 2012.