

# Influence of Infrastructural Complex on the Wealth and Lines of Development of Regional Economic Space

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## Abstract

This article aims to establish the role of industrial, transport, social and institutional infrastructure as a “growing point” of the regional economic area. To accomplish the purpose the article presents a theoretical model to manage infrastructure complex development; defines an algorithm to form “growing points” within the framework of territorially located spatial entity. Correlation between information infrastructures development and financial sector organizations is positive while the tie between railway and roads provision and the GRP volume is negative. The admission of national and regional economic space multipolar character predetermines the necessity to search for “its growth areas”, the activation of which provides for their turning into the supporting territories and faster development zones, which in its turn predetermines spatial parameters and finds its reflection in the dynamics of aggregated factors of territorial subdivisions development.

**Keywords:** regional economic area, infrastructural complex as a growing point, economic area polarization, economic growth, regional management

## 1. Introduction

According to the official data (Regional Development Ministry, RF, 2012), the “growth driver” regions and the “key leading regions” are the Russian Federation entities which locate on their territories power resources deposits or territorial entities which enjoy infrastructural potential or beneficial geographic location (the cities of Moscow, St. Petersburg, the Republic of Tatarstan, the Nizhniy Novgorod Region, the Tumen Region autonomous areas, etc.). The latter is conditioned upon forming efficient institutions, which provide better investment climate on the territory together with absolute and comparative advantages such as a better geographic location or a better developed infrastructure.

Among the most significant subjective factors that help extend topical area of modern economics we can name the following:

- 1) need to overcome the limitations of gnoseological potential of economic mainstream, which does not take into consideration the ambiguity of the environment and the growing transaction expenses;
- 2) existence of some additional (supportive) motivation parameters, related to the existence of social norms and enforcements, together with the rationally pursued interests;
- 3) lack of analytic tooling to provide a thorough investigation of alternative and multiple-option path for economic growth, multiple level system, asymmetry and asynchrony of spatial transactions.

As a result, “economic space” as a notion is interpreted as the central notion and at the same time the tool of learning within the framework of a thorough concept, whose target of research are transactions in a multi-level system to measure the path of business progress. All these factors determine the timeliness of the issue.

The conceptual approach represents an amplification of several theories: that of spatial economic organization by A. Lesh, the theory of innovation diffusion by T. Hägerstrand, the theory of growth poles by F. Perry, the development axes theory by P. Pottier in the context of post-industrial era in economic development and the core competencies theory by G. Hamel and C.K. Prahalad. A number of assumptions of economic space theory were stated in the middle of the XX century by A. Granberg, F. Fetter, H. Hotelling, etc. Certain theoretical problems

of space economy were set up as a part of manufacturing locations approach (W. Isard, A. Weber, W. Christaller, W. Launhardt, T. Palander, G. Ritschl, J. Thunen, etc.).

## 2. Methods

Theoretically and methodologically the research is based on conceptual guidelines of fundamental and applied works by the leading national and foreign scholars investigating regional management, spatial planning, systems theories, urban economy, innovation development, government regulation of economy, management decision making, social and economic forecast and programming.

Methodological approach viewing the region as a quasi-corporation, makes it possible to use the cognitive/informative potential of the core competencies theory by G. Hamel and C. K. Prahalad to find out forms and methods allowing regional authorities influence the infrastructure complex as a “growing point” of economic space (Hamel & Prahalad, 2002).

Methodological tooling used to solve the problems set, is based on dialectical method, which provides a system and complex approach to the problem under investigation (Isard, 1966).

## 3. Results

The study undertaken enabled us to uncover the substance of national and regional economy infrastructure complex, which is treated as a set of business entities providing reproduction of national and local, pure and mixed public network goods. It proves that infrastructure complex is generally characterized by dominance of common benefit over private, and necessarily implies high frequency and intensity of simultaneous transactions, participation of the state in contractual relationship. At the same time the infrastructure complex is comprised of industrial object (aimed to meet solely industrial needs) and social object (aimed to meet personal and industrial needs), which made it possible to establish an authorial typology of regional formations.

## 4. Discussion

Each cyclical phase typically has a specific structure of economic space which is defined by the functions of its constituents. As the economic area lifecycle phases change, the level of polarization grows, together with the level of structuredness, the level of possessory right differentiation and specification and the level of self-organization. The choice of transformation processes management model is defined by the phase of its lifecycle, state of its transformation and transaction assets.

Regional core competencies include the following: life necessities competency, i.e. ability to create common living standards, which meet the basic demands of the local community and improve the quality of life; mastery competency, i.e. ability to produce public goods as a common condition of economic performance in accordance with international and national standards; knowledge competency, i.e. ability to provide a closed cycle of innovations; contact competency, i.e. ability to commence network goods production, development and efficient performance of network formations; efficient management competency viewing infrastructure complex as a single system to provide sustainable development; collaboration competency, i.e. ability to elicit and coordinate individual, group and public interests which makes it possible to form strategic targets and aims and find the road to achieve them.

The Russian Federation has no unified approach to estimate the nature of infrastructure complex as an integral formation, while in the USA infrastructure is treated as *public works* including roads, airports, water transport, water supply and sanitation, solid waste management and mass transit systems.

Lack of a clear definition leads to lack of a unified methodological approach, used by official statistical data producers while classifying corresponding objects, measuring their performance indicators and determining the role of infrastructure in developing national economy and its regional components. Therefore, to estimate the infrastructure complex performance it is common practice to use indirect data, which prohibits treating these indicators as objective. (Granberg, 2004; Lvov, 2013; Poliakov, 2013).

Methodological base to estimate the nature of infrastructure complex is the social well-being theory, which enabled us to reveal its elements as a business entity reprocessing national and local, pure and mixed goods which possess substantial positive externality. In addition, within the framework of infrastructure complex we distinguish between social infrastructure objects which process public goods to meet personal needs only, and industrial infrastructure objects which process public goods to meet both personal and industrial needs. The first group includes healthcare, education, culture, public service and other institutions. The second group comprises transport and information services, energy and water supply systems, etc. The attribute of infrastructure complex is a higher level of frequency and intensity of transactions involving its own objects as opposed to transactions in

partnership with other entities. Yet economic time, treated as a multidimensional system to measure the social and economic development path, made it possible to reveal the line of transformation of economic spatial organization (territorial division of labor law, law to save on the costs to bridge the distance gap between industrial entities, industrial agglomeration law) by involving transaction factors in their mechanics (Lugovoy et al., 2007). This creates an opportunity to settle the role of infrastructure complex as an economic space “growing point” which acts in the capacity of an alternative to its reading as a consequence of development of major economic sectors which usually constitute relative competitive position of territorial formations.

Such a development model provides evolution of post-industrial economy, defined by a top role of processing centers. Technological clusters are based on infrastructure complexes related to agglomeration modules of the national innovation system (Musgrave, 1998; Ullman, 1983).

The change of role played by infrastructure complex in the economic space at post-industrial phase of social development manifests itself in its functional modifications. In industrial economy infrastructures performed the functions of reproducing the main residential properties, supplying and distributing, transporting, distributing and exchanging material goods in the social sphere, satisfying private household demands, healthcare and maintaining ecological balance, forming scientific world outlook and public conscience, information consultant services and providing scientific activities, public services delivery, securing national defense and maintaining public order (Hägerstrand, 1970; Musgrave, 1983).

Economic space transformation led to:

- 1) change in structure and expansion of the functions performed by infrastructures, which provide optimal allocation of new and/or transformation of old (reconstruction, retirement, etc.) transactions agents and assets on the given territory using the new geo-informational approach in post-industrial economy;
- 2) rise, intensification, smoothing and control of inter-regional differentiation based on functional level, sectoral, territorial and infrastructural inequalities;
- 3) integration of business entities on supranational (international transport corridors, World Wide Web), inter-regional (national transport system, national gas and energy delivery) intra-regional (regional transport system, regional public services system), sub-regional (heat and water supply of municipal formations) level;
- 4) creation of a background to develop and implement relative competitive position of territorial entities (infrastructural potential as an element of resource potential of the territory)
- 5) infrastructural support for federal and regional management;
- 6) innovations diffusion along and beside the development lines, initiation of transactions whole new in content and destination;

modification in territory configuration (Allen & Sanglier, 1981; Chamberlin, 1962; Hägerstrand, 1970; Lander & Hecht, 1980).

Such a methodological approach made it possible to work out a typological structure of regions, based on classification criterion of spatial organization. Among the federated states there are regions with various patterns of spatial organization: focal and scattered (substantial part of European and Asian North, as well as the southern regions of Siberia, Far East, distant from the railway); uniformly central (Central Chernozemic district, large territories of other economic districts in the European part); agglomeration central (the best developed industrial parts of North-west, center, Volga region, Ural, South of Siberia). According to the approach suggested, among the regions of Volga Federal District federated states with focal and scattered spatial organization are the following: the Republic of Mordovia, the Republic of Marij El, the Kirov Region, the Penza Region and the Perm Region. The regions with uniformly central spatial organization are the Republic of Bashkortostan, the Udmurtian Republic, the Chuvash Republic, the Orenburg region, the Saratov Region, the Ulyanovsk region (Boots, Drobyshevsky, Kochetkova, Matginov, Petrov, Federov, Hecht, Shekhovtsov, & Yudin, 2002). The regions with agglomeration central spatial organization are the Republic of Tatarstan, the Nizhni Novgorod Region, the Samara Region. Interrelation between the development level of the infrastructure, and the growth rate of the main meso-economic indexes was revealed in the course of the study while estimating the correlation coefficients for the regions of the Volga Federal District (Table 1).

Another analysis undertaken in the course of work is a pair correlation coefficient of physical quantity of Gross Regional Product dynamics indexes and single infrastructure development indexes, pair regression coefficients of physical quantity of Gross Regional Product dynamics indexes and single factors of infrastructures development in the regions of the Volga Federal District.

Table 1. Pair correlation coefficients of gross regional product per capita and single development indicators of infrastructures in the regions of the Volga federal district 2005-2011 (Russia in numbers, 2012)

2005	2006	2007	2008	2009	2010	2011
Public railway lines density, km. of line per 10,000 square km. of territory						
-0.007	-0.004	-0.004	-0.004	-0.002	-0.001	-0.001
Public hard surface roads density, km. of roads per 1,000 square km. of territory						
0.6294	0.7061	0.7548	0.7819	0.7807	0.7888	0.8406
Number of landline telephones available per 1,000 citizens						
0.6213	0.7025	0.7492	0.7455	0.7872	0.8131	0.8249
Number of personal terminals of cell communication						
0.7226	0.7364	0.7381	0.7438	0.7616	0.8289	0.8571
Number of credit institutions and their affiliated branches						
0.7034	0.7122	0.7226	0.7278	0.7437	0.7718	0.7875
Number of insurance companies offering direct insurance						
0.2316	0.4275	0.6037	0.7339	0.7847	0.8441	0.8782

The admission of national and regional economic space multipolar character predetermines the necessity to search for "its growth areas", the activation of which provides for their turning into the supporting territories and faster development zones, which in its turn predetermines spatial parameters and finds its reflection in the dynamics of aggregated factors of territorial subdivisions development. "Growth areas" are characterized by their belonging to a particular type of economic activity; by the potential type and structure (of the competitive strengths) on the basis of which the progressive advance is performed; by the active assets placement order around a particular territory; by the content, order of elaboration and implementation of the development strategy (<http://www.raexpert.ru/ratings/regions>). The modified economic dynamics model, which views the transaction factors alongside with the factors of demand, offer and distribution as sources, allows to consider the infrastructure complex of territorially localized system a "growth area", because the infrastructure development provides for the changes of all parameters of economic space, namely: change of the space location (configuration) of economic agents, increase of the frequency and intensity level of transactions, and also the economy of aggregate time, which serves as the organizing principle of changing the technological mode and institutional environment.

Infrastructure complex as a "growth area" of the regional economic space is characterized by the following attributive features: inclusion into the system of intersectoral and interregional transactions, which provides high multiplicative effect of changing of aggregate indexes of the regional economic development (general economic effect); high average ratio of economic added value generated by the total of enterprises including the ones of the infrastructural complex and the adjacent ones, which is conditioned by the content of the growth mechanism presented by the reinvestment of income generated by the economic agents which it is comprised of; a steady demand for the infrastructure complex enterprises production, presented by the autonomous (conditioned by absolute) and external (conditioned by relative competitive strengths of the region in the national economic space) demand; high economic (GNP growth), social (creation of new work places, increase of investments into the human capital assets), budgetary (tax revenues growth into the regional budget in all activity categories constituting the "growth area"), financial (internal rate of return, payback period, the payback period index) effects of investment expenses on the development of infrastructure objects.

## 5. Conclusion

Having analyzed the information obtained in the course of investigation we can conclude that interrelation between the development level of an infrastructure and the level of Gross Regional Product in the regions of the Volga Federal District is rather significant while there are no substantial ties between incremental amounts. Correlation between information infrastructures development and financial sector organizations is positive while the tie between railway and roads provision and the Gross Regional Product volume is negative. This is due to the fact that transport infrastructure is typically highly capital intensive and inertial. Major part of modern transport infrastructure objects was made under administrative state-planned economy according to the principles standing far from market economy. This calls for a number of modifications in accordance with the principles of post-industrial phase of economic development and use of modern geo-information approaches. The study did not reveal any stable correlations between manufacturing expenditures and the development level of infrastructures, or between infrastructure economic security and the incremental indexes of the Gross Regional Product.

## 6. Inferences

Therefore, admitting contradictory impact of infrastructure on the wealth of economic space and trends in the main meso-economic indexes we can infer that it is necessary to seek for efficient methods to influence the elements of infrastructure complexes in order to unlock its potential as a “growing point”.

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