

# The Notion of «Transport – Communication Infrastructure» Formation in the Russian Economic Thesaurus

## La noción de «Transporte - Infraestructura de Comunicación» formación en el vocabulario económico ruso

Viktor BLAGININ [1](#); Tatyana KHUDYAKOVA [2](#); Elena ALIMOVA [3](#)

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#### ABSTRACT:

In modern economic research on transport, the authors most often use the terminology of the «transport infrastructure», this can be said to be the generally accepted rule. However, with the passage of time and the development of technologies, such a definition has lost its functionality and scientific strength. The authors put the hypothesis of the urgency of introducing and using a broader concept of "transport-communication infrastructure". In this study, the authors set the task of analyzing the current state of theoretical research, in which the main object of study is the «transport-communication infrastructure». A model of the formation of the current concept is being constructed, it is proved that the basic component is the transport infrastructure. A retrospective evaluation of the formation and functioning of the designated definition in the modern economic literature is being formed. As a result of the research, the authors formed the main scientific provisions and premises for the use of the

#### RESUMEN:

En la investigación económica moderna sobre el transporte, los autores suelen utilizar la terminología de la «infraestructura de transporte», esto se puede decir que es la regla generalmente aceptada. Sin embargo, con el paso del tiempo y el desarrollo de tecnologías, tal definición ha perdido su funcionalidad y fuerza científica. Los autores plantean la hipótesis de la urgencia de introducir y utilizar un concepto más amplio de "infraestructura de transporte y comunicación". En este estudio, los autores se propusieron analizar el estado actual de la investigación teórica, en la que el objeto principal de estudio es la «infraestructura de transporte y comunicación». Se está construyendo un modelo de la formación del concepto actual, se demuestra que el componente básico es la infraestructura de transporte. Se está formando una evaluación retrospectiva de la formación y funcionamiento de la definición designada en la literatura económica moderna. Como resultado de la

economic category under study.

**Keywords:** transport – communication infrastructure; transport infrastructure; economic research; definition.

investigación, los autores constituyeron las principales disposiciones científicas y premisas para el uso de la categoría económica estudiada.

**Palabras clave:** transporte - infraestructura de comunicaciones; Infraestructura de transporte; Investigación económica; definición.

## 1. Introduction

Under modern conditions of deep transformation of the country's economics, geo-political structural transformation and the necessary spatial integration the regions' development comes to the first position and the formation of the new infrastructure becomes the main one among the other regional processes.

Infrastructure is the nuclear of any economic system on the micro, mezo and macro level having the function of the connecting link of the subject favorable economic activity.

Infrastructure is the complex independent multielemental system, determining the population living standard, investment attractiveness of the territory and the possibility to accelerate socio-economic regions development and the country as a whole.

Western economists pointed out, enlarging thesaurus enrichment and the term «Infrastructure», in economic literature relative recently in the middle of XX century. There are two points of view for chronology of the first mention of the notion (infrastructure") of the Latin terms infra (lower, under) and structure (construction, location). The first view point is based on the opinion of the scientist-economist Samuelson, who considered the term infrastructure to be introduced in the economics by American P. Rosenstein-Rodan (1961, p. 60) in connection with all conditions of the environment which is necessary for the private industry to be able to make the first market for the development. However, as S. Kelbakh (2015, p. 331) fairly points out the given explanation is similar to the Adam Smith's thoughts in his work «The exploration about nature and the reasons for the peoples wealth», where the author told about the existence of the necessary constructions for production of different kinds of subjects...in society managed properly and nearing to the universal wealth, spread to the lowest strata of the population impossible without the construction of additional warehouses, roads, communications, housing of the workers (Smith, 1992, p. 132). D. Ricardo supported these views in his work «The principles of political economy and taxation» R.-R. pointed out social and national activity infrastructure that was later called productive (Ricardo, 2007).

In A. Yongson's, P. Samuelson's and some other western economist opinion progenitor of the term is H. Singer, who used the term overhead capital at the beginning of 1940 in his works «Overhead capital at the beginning» of 1940s in his works Overhead capital included productive and invoiced capital. The economist suggested the concept of "balanced growth" by means of unbalanced investments" according to that effective development of the society and economics can be achieved by the development of its own production and social infrastructure. (Singer, 1964). This fact testifies not only the similarity of H. Singer and P. Rosenstein-Rodan but also modern understanding of the influence and importance of infrastructure development.

P. Samuelson emphasized that the state consciously goes on investment in infrastructure, since "social overhead capital" creates "intangible benefits, from which it is impossible to expect cash profits for private investors, since" the scale of some of them are too large for limited private capital markets, and others will pay off for too long a time so that private investors are very interested in them" (Samuelson, 1992, p. 324).

A. Pesenti noted that "classical capital investment, which requires capitalism from the state, should have as its object" public works ", i.e., the creation of such a set of conditions, which are now referred to in the world as" infrastructure "(road network, vehicles, land management and so on) (Pesenti, 1976, p. 115). The views of P. Samuelson and A. Pesenti coincided in the context of the need for government intervention in the economy to create conditions for the sustainable development of private entrepreneurship. This position was further developed by

representatives of the Oxford University (Carlsson, Otto, & Hall, 2013, p. 263) who tried to explain the role of infrastructure in macroeconomic growth theories, as well as the Danish (Dahlberg, 2016, p. 37) and the Russian representatives of the scientific schools (Baskakova, & Malafeev, 2016, p. 361), whose works dealt with infrastructural failures and new conceptual provisions. All these scientists considered the infrastructure as a separate entity with functioning resources that support business activities.

The West German scientist R. Jochimsen has made significant progress in terms of the production approach, defining the infrastructure as "the aggregate of the material, institutional and individual conditions of the economic units at the disposal of economic units and the equalization of incomes associated with the equal productivity of factors that, when appropriately allocated, ensure full integration and possibly the highest level of economic activity" (Jochimsen, 1966). For the first time, he distinguishes, apart from production and social, institutional and "personified" infrastructure.

Domestic economists and sociologists also contributed to the concept of "infrastructure". First of all, it is worth noting the contribution of scientists who engaged in economic geography in the 1960s and 1970s. They viewed the infrastructure through the prism of territorial development. Mayergoyz I.P. Considers infrastructure as "a system of spatially expressed elements of a material and technical nature that form the most common prerequisites for managing in any territory" (Maergoyz, 1971, p. 36). In addition to the territorial one, Debabov S.A. The activity approach that represents the infrastructure as a set of economic objects of the region (fixed assets) and engineering measures implemented to ensure material production and normal living conditions of the population on the territory is reflected (Debabov, 1973, p. 137).

All of them in one way or another meant a set of facilities under the infrastructure capable of qualitatively developing production, and, often, the transport infrastructure was the main example. However, a tectonic shift to economic science has generated conflict in the theory and methodology of infrastructure research and, in particular, transport infrastructure. The authors will try to prove the necessity of using a more extended concept of transport-communication infrastructure in sociological and economic studies. By the way, recently more and more attempts have been made to divert the transport infrastructure into an independent infrastructure branch and evidence of its connecting nature. The main suppliers of research on this problem in recent years are Indian scientists (Mojtahedi, & Oo, 2017, p. 841; Maparu, & Mazumder, 2017, p. 319).

Hence, the purpose of this article is to review the theoretical premises for the formation of the term of transport-communication infrastructure, to highlight the features of constructing this definition (in particular, to divide the concepts of "transport infrastructure", "communication infrastructure" (Literat, & Chen, 2014, p. 83) and "transport-communication infrastructure" and propose its new understanding that is necessary To use in modern economic realities. Thus, this article develops an international econometeorological apparatus of knowledge.

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## **2. Methods**

The paper presents the theoretical realization of the objects (the theories and views) under consideration and that's why the main methods of research should be the semantic analysis of theoretical principles and concepts touching upon functioning and development and realization of transport-communication infrastructure as a whole and transport infrastructure as the independent economic object. Also, the mechanism of scientific analysis of the development of economic categories provided to be the fundamental one.

This publication is a review article, in connection with which the main research mechanism should be considered scientific information search and methods for constructing theoretical models.

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## **3. Data, Analysis, and Results**

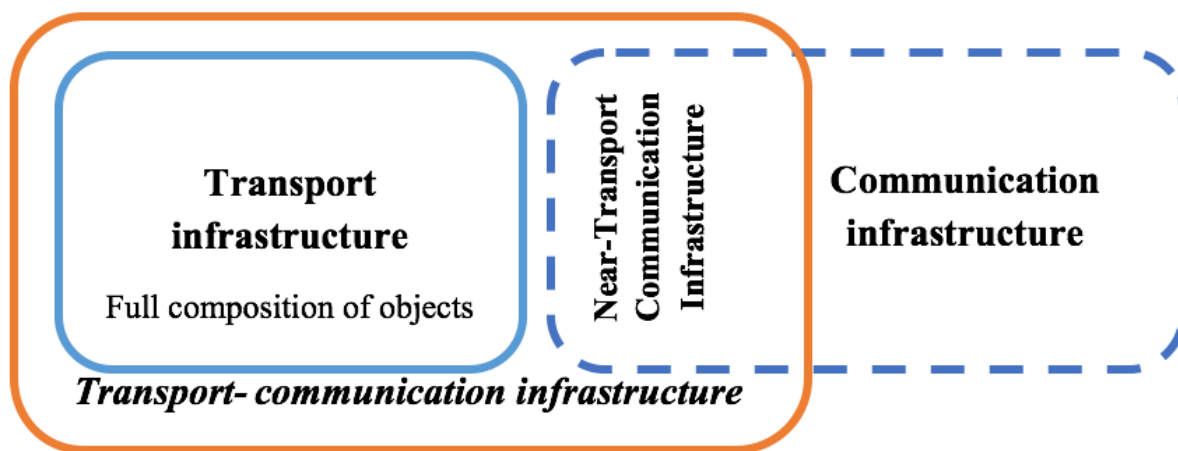
One of the main elements of infrastructural complex is transport infrastructure, providing effective work of transport and taking part practically in every production process though not creating product itself. For Russia the country having got the great territorial potential the transport infrastructure, itself can provide economic growth at the expense of taking up space during the short period of time (Blagin, 2016, p. 979).

The scientists of different scientific trends elaborated the theoretical principles of realization the essence of transport infrastructure: regional economics, logistics, transport economics. However, transport economists take aim at the research of technical features of the given kind of infrastructure, logistics in their turn study transport flows, as the integral part of production process. When the economists-regionalists consider transport infrastructure as the means of space narrowing and socio-economic acceleration ties (shortage of the communication time) providing the growth of effectiveness of work and territories development the authors offer to consider economic category of transport-communication infrastructure as the main one.

The notion «transport-communication infrastructure» in modern economic literature is studied not in detail. In general, vision transport – communication (informational) infrastructure is determined as symbiotic combination of two infrastructural elements: transport and communications. At present research in this category reads as following: the kind of infrastructure complex having the special form of transport infrastructure, having the function of narrowing the territory's. And acceleration of space and time communication and also the formation of the whole regional frame and territorial integration as the result the functioning (fig 1).

M. Dobyndo keeps to this interpretation and considers in his work "Analysis the transport-communication infrastructure as the factor of deepening of interregional economic integration in Federal Okrug. He points out the necessity to study the influence of transport – communication infrastructure and its effect on the creation of the single economic space, calling infrastructural prerequisites the most important factors, promoting the development of interregional integrations (Dobyndo, 2008, p. 44).

**Fig.1.** The principal scheme of the definition «Transport - communication infrastructure» as the research object



Many scientists studying the theoretical aspects of their transport – communication infrastructure development pay attention to the ability to provide the population and economics with transport-communication. A. Shipilov stresses, that the environment must correspond to persons communication requirements at the expense of technical and nontechnical components included to it, where transport infrastructure is only subordinate component of the single whole and calls such an environment as transport-communication (Shipilov, 2009, p. 166).

S. Kudryavtseva, K. Neganov refers to the previous works and considers that uneven distribution of the transport – communication infrastructure is the restraining factor of development united the whole economic and transport-communication country's space and limits the use of resources in the regions and make difficult the formation of transport-communication environment (Kudryavtseva, & Neganov, 2016). Similar positions can be seen in

the materials of independent comparison of transport-communication indicators in PFO.

I. Mogilevkin realizes transport-communication infrastructure as to be the type of infrastructure, using the technology providing vital activity of all branches of activity with the main function of accelerating economic ties (Mogilevkin, 2006, p. 69). It is necessary to note, that this interpretation is similar to traditional understanding of "transport infrastructure" Economist YU. Zadvornyi didn't apply directly to the term "Transport-communication infrastructure, but reciting the terminology used in the sphere of information – communication technologies stressed soft and strong elements of transport infrastructure. To strong elements the scientist referred for the first turn communication and informational systems (communication ties, telecommunications), information networks, inquiry systems) navigation services, and only after that roads, bridges, port canals, terminals, warehousing complexes, and then he used the definition transport-communication infrastructure (Zadvornyi, 2010, p. 10).

On the whole the notion transport-communication infrastructure development in modern economic thesaurus is formed as a combination of technical and space forming factor of the development of transport infrastructure development and that is why these 2 categories are often identified, more often in foreign literature.

In particular, Hungarian specialists in the sphere of infrastructure, K. Pallai adds standard transport infrastructure (automobile, railway, air, sea, water, tube transport, logistic terminals, railways, sea and river transport and also attendant infrastructure (Bulatova, & Tikhonova, 2015): Infrastructure ties (communication) functionally and physically connected with transport (Pallai, 2003, p.177). Besides, communication infrastructure is explained in two ways, as engineering communications, communication optic fibre wires, lines along transport arteries and infrastructures, providing communication (personal communications, physical information transmission that is communication ties.

The analyses of literature, devoted to theoretical aspects of functioning transport-communication infrastructure confirms above mentioned position of the authors and we consider it necessary to apply to the theory of transport infrastructure.

The level of transport infrastructure development, as a whole, determines the level of economics development also as a whole, and is one of the factors, determining economic attractiveness of the territory and its potentials as a whole (Pozamantir, 1991, p. 32). In spite of the understanding great importance of studying at present there is no definite point of view for the transport infrastructure and which objects should be included in it.

If we apply the normative documents in accordance with the Federal Law of the Russian Federation of February 2007, N16 FZ «On transport safety» the object of transport infrastructure is technological complex, including (A) railway, automobile, railway stations (B) metro, tunnels, bridges, trestles (C) sea terminals, sea ports, (D) artificial islands structures (E) airports, airdromes, objects of communication systems navigation and managing of transportation. (G) Parts of automobile ways railways and internal waterways, landing areas, and other places providing the development of transport complex, buildings, structures, devices and equipment.

From above mentioned interpretation, it becomes clear that transport infrastructure includes full spectrum of serving infrastructure. Professor R. Radzabov thinks that transport system is the undersystem of market economy, being necessary (Radzabov, 2000, p. 42) and compulsory element of its normal functioning E. Mustakaeva shares the approach (Mustakaeva, 2013, p. 137).

In addition, the scientist points out that being the branch of material production, transport is the infrastructure serving the rest branches such energy systems, communication systems, information networks. L. Serebryakov and V. Yanovsky consider the frames of the given the approach and define transport infrastructure as the part of engineering infrastructure including complex transport communications and devices, providing cargo and passenger transportation (Serebryakov, & Yanovsky, 2011, p. 206).

It is necessary to stress, that the approaches besides branch (technocratic) there are also functional and cost approaches and the number of main methodological approaches to the notion of transport infrastructure.

In the framework of functional approach transport infrastructure is considered as the function combination, used to form effective system of transportation of people and cargo. A. Maximov the representative of the statement considers that the transport infrastructure should be understood as the combination of the material-technical and organizational conditions, providing rapid and unhampered transport process (Maximov, 2007, p. 30). Transport infrastructure from cost approach view is considered as a special kind of regional capital as investment object. Special features of transport infrastructure as the object of investment consists of the fact that it does not create but makes difficult evaluation of investment effectiveness to the given field.

Thus, YU. Golskaya understands regional transport infrastructure as infrastructural capital having specific social character, that is expressed in transport infrastructure capability to bring profit not only to economic, but socio-cultural, and causes synergetic effect of its realization (Golskaya, 2013).

Implicit category is inserted to economic term from pedagogical theories). Some scientists – economists are of the opinion (like a A. Kudryavtsev and L. Rudneva) that for more productive defining of transport infrastructure notion it is more expedient to use combination of all three approaches. Taking into account these principles they pointed out that under transport infrastructure one should understand special kind of infrastructural complex having specific region forming character expressed in transport infrastructural possibility to provide territorial regional integrity and conditions for its socio-economic development (Kudryavtsev, & Rudneva, 2013, p. 139).

According to the opinion of the representatives of the Ural economic science N. Matushina and L. Averina one of the main methodological principles in the analysis and prognoses of transport infrastructure development is combination of the branch and territorial approaches. According the scientists notes "under branch approach the state of each under system of transport infrastructure is evaluated – under territorial – spatial arrangement of its elements (Matushina, & Averina, 2012, p. 11).

The author keeps to this system understanding, though they suggest using functional, technocratic and territorial methodological approaches as the notion principle notion. The given position support is based on the realization of Russian socio-economic reality. Transport infrastructure for the first turn is the complex of engineering structures, providing constant communications that in Russian conditions is rather difficult because of climatic and geographical factors. Transport infrastructure of different regions is specific and needs specialized staff and technical adaptation – under these conditions technocratic is inevitable. Secondly, as it was pointed out before transport regional infrastructure is combination of special functions, production and organizational to that. In Russian reality there is the necessity of overcoming great distances transport-transport infrastructure of the enterprise region country are... logical processes for transportation of raw materials and ready production, in other words, despite evaluation complexity it is possible to state that transport infrastructure contribution to YNP rather is great. The most important function of the region transport infrastructure, stressing its connecting character is the regional interaction and strengthening of interregional integration.

Third, special placing of the objects of transport infrastructure form dominant of studying in connection with the territory, region. Introducing investment approach we consider unnecessary, after consideration of the transport infrastructure as the capital under the conditions of functional approach while evaluating the forming consolidated product. I. Belov and V. Persianov stress impossibility self-repayment of infrastructure subjects when using equal tariffs (Belov, & Persianov, 1993, p. 415).

## 4. Discussion

Summing up semantic analysis of the notion «transport-communication infrastructure» in the works of the native scientists economists and sociologists (Dobyndo, 2008, p. 44; Golskaya, 2013; Kelbakh S., 2015, p. 331) we can point on the main statements:

1. The basis of the definition is the transport infrastructure and the accompanying communication infrastructure (responsible for communication of people), which cannot be considered a separate unit;
2. This economic category began to be studied only in the current century, before the main studies were separated from the accompanying infrastructure
3. The transport-communication infrastructure as an independent branch of economic activity needs to be studied; the methodology of analysis has already been developed by foreign scientists.

Received theoretical positions, both applied for the Russian economic science and for the foreign community, but so far not many scientists have argued about the existence of a correlation between the two types of infrastructure. Presented theoretical model for the formation of the type of infrastructure under study.

The premises obtained in the framework of the research of the theory of the concept of "transport-communication infrastructure" can and should be used for economic analysis of the development of the territory, in the first place. Western European representatives of applied science have long appropriated the transport function of the transmission of information, in connection with which the transport and information policy was formed in countries and megacities. It is encouraging that these positions are reflected in the Russian experience, and in many regions, the Ministry of Transport and Communications is being formed.

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## 5. Conclusion

The authors believe that this article has the opportunity to be evaluated by the scientific community, in view of the detailed analysis of the object under study from the perspective of transport theory and the regional economy. The definition of the transport-communication infrastructure should be used instead of the concept of transport infrastructure in studies related to the development of a certain area, since it most fully reveals the potential of infrastructure influence on the socio-economic spatial field. The authors hope that this work will contribute to a better study of the impact of the transport-communication infrastructure on the accompanying socio-economic processes by increasing the conceptual and exponential field of the definition.

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1. Regional, Municipal Economy and Management Department, Ural State University of Economics, Ekaterinburg, Russia.  
E-mail: [v.a.blagin@usue.ru](mailto:v.a.blagin@usue.ru)

2. Quality Management Department, Ural State University of Economics, Ekaterinburg, Russia.

3. Foreign Languages Department, Ural State University of Economics, Ekaterinburg, Russia

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