APPROACHES TO THE FORMATION OF SUSTAINABLE ECONOMIC DEVELOPMENT OF TRANSPORT SYSTEM

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Abstract: The world economy as an integrated system has limited growth limits, natural resources are limited, so a new concept of sustainable economic development has emerged, based on a balance of the economy, social goals and ecology. Sustainable development is the development of the country's economy and the global system in which current needs are met without compromising future opportunities. The rapid development of transport infrastructure creates the prerequisites for the sustainable development of centers of macro and microeconomic growth and helps to reveal their potential in the future.

The article considers the role of transport as an additional priority for sustainable development at the macro level and the types / functions of connectivity of economic growth centers in the sectoral and regional aspects.

In turn, the concept of sustainable development of the transport system involves taking into account the features of the transport system as an object of increased danger and a high degree of influence on the main priorities of sustainable development (economic growth, social system and ecology) of the macroeconomics. It was noted that, on the one hand, the transport system, being part of the country's macroeconomic system, affects the priorities of its sustainable development, and on the other hand, has independent priorities for sustainable development in the field of economic growth and efficiency, social potential and environmental aspects, including issues of ensuring security.

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Introduction

The world economy as an integrated system has limited growth limits, natural resources are limited, so a new concept of sustainable economic development has emerged, based on a balance of the economy, social goals and ecology. Sustainable development is the development of the country's economy and the global system in which current needs are met without compromising future opportunities. Depletion of natural resources and the negative consequences of environmental degradation, including desertification, droughts, land degradation, lack of drinking water and loss of biodiversity, multiply and exacerbate the many problems facing humanity. One of the most serious problems of our time is climate change, and the negative consequences of this phenomenon undermine the ability of all countries to achieve sustainable development. The rapid development of transport infrastructure creates the prerequisites for the sustainable development of centers of macro and microeconomic growth and helps to reveal the potential of the global economy in the future.

Sustainable economic development of transport system

Instead of a utilitarian economic approach to assessing the effectiveness of macro and microeconomic systems, the concept of Sustainable Development has emerged. This concept is based on a comprehensive assessment of not only economic results, but also the environmental and social consequences of the functioning of the economy (Medouz, 1991). The ideas of systemic dynamics made it possible to draw a number of serious theoretical conclusions and develop models for the interaction of natural and economic processes. Sustainable development is a qualitatively new stage in the evolution of environmental and economic relations associated with the construction of a harmoniously organized society, which is able to ensure an equilibrium and balanced interaction of environmental, social and economic development factors.

A challenging task is set by the coordination of priorities and their translation into the language of specific events that are means of achieving sustainable development, as all three elements of sustainable development must be considered in a balanced manner. Another important issue is the mechanisms of interaction of these elements. The interaction of economic and social elements give rise to many new tasks.

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The modern world and the globalization of economic processes puts forward an additional priority, which determines the coherence of the elements of economic systems in the concept of sustainable development - transport and the development of transport infrastructure.

Sustainability of a transport system is understood as its accessibility and meeting the needs of society in moving without harm to the ecosystem, ensuring the stable, reliable and efficient functioning and development of transport in the territory it serves. Numerous researchers, for example, note that the main ways to achieve sustainable transport development focus on information and communication technologies, reducing environmental pollution, improving the quality of life and meeting the needs of residents, rational land use, prudent regulatory regulation, tariffs, traffic management and transport management.

In turn, the concept of sustainable development of the transport system involves taking into account the features of this system as an object of increased danger and a high degree of influence on the main priorities of sustainable development (economic growth, social system and ecology) of macroeconomics. Therefore, on the one hand, the transport system, being part of the country's macroeconomic system, has an impact on the priorities of its sustainable development, and on the other hand has independent priorities for sustainable development in the field of economic growth and efficiency, social potential and environmental aspects, including safety issues.

Transport has ceased to be a narrow sphere of interests of carriers and their passengers. Obtaining the results of useful transport and logistics activities goes beyond the interests of an economic entity and extends to the territory and certain groups of citizens, determines the involvement of the entire population, government and local governments in global strategic decisions (Yefimova and Loskutov, 2019).

Considering the country's transport system as one of the priorities for sustainable development, it is proposed to formulate a quantitative model of the connectedness of economic growth centers in the sectoral and regional aspects, based on the concepts of a set theory.

Figure 1: Graphic representation of connectedness of transport-economic structure

Source: Authors

The connectivity between the elements in the economic system reflects the influence of one subject of the national economy on another subject, which can be understood as territorial entities (regions, regions, municipalities, etc.), and business entities (companies, holdings, entire industries). Signs may reflect resource relations, product aspect of interaction, population migration, environmental impact. The sign by which territorial connectivity is determined is, first of all, traffic flows. In addition, labor migration also determines territorial connectivity, so there may be several signs of connectivity: A, B, C In modern conditions, the connectivity of regions is determined by both technical and technological readiness for communicative information interaction. The preferred element of the pair is element λ_2 in Figure 2.

The significance of transport as an element of communication between centers of economic growth is described by the connectedness of a set consisting of conjugated elements λ . In the hierarchical structure of a complex system, the elements with the least number of connections, called the minorant, have less potential for sustainable development than the elements with the largest number of connections and signs - global majorants.

Two elements s_i and s_j are called directly connected in the system if there are information and control flows $\eta(i,j)$ and $\eta(j,i)$ and, simultaneously,

$$[\eta(i,j) \vee \eta(j,i)] = 1.$$

The direct connection of the elements means that between them a direct transmission of effects is carried out, which determines the function of communication.

The application of the described formalized model will allow us to study the mutual influence of regions on the development of the national economy as a whole, the mutual influence of industries. Consideration of the connectivity of industries and territories allows us to formulate a sound strategy for the country's spatial development. Many countries choose the concept of centric development with powerful agglomerations of industrial development and concentration of the living population. An alternative is the strategy of distributed development of the territory, in which the ecosystem of the economy evenly covers the territory of the country. For Russia, the choice of this strategy is extremely relevant, including transport support for the country and the needs of the manufacturing sector.

Transport infrastructure development projects can be a source of development of business growth centers, or the consequences of their creation and development, their interconnection is an essential sign of sustainable development of the industry or region's economy. In addition to direct communication with respect to system elements, various types of indirect communication between elements are of interest. In some cases, the transport system and the projects for its creation and reconstruction are the drivers of economic growth of entire branches of engineering, production of building materials, construction, etc. If you rephrase the words of the great architect and urbanist Le Corbusier (1887 - 1965), who formulated the basic principle of the development of urban forms of settlement, it can be noted that the country's economy cannot grow faster than its transport is developing.

Sustainable transport development favorably affects the economy (Grishayeva et al., 2018). The regional component of the gross national product depends on various transport characteristics: the availability of roads, the density and length of lines of various modes of transport, transport accessibility of territories, level of use of information technologies, etc.

Coordinated actions at the local, regional, national levels should ensure the universality of information support, control and evaluation of the functioning of the entire transport system, create a basis for monitoring transport mobility, establish criteria for evaluating management decisions, which will allow for a comprehensive assessment and comparison of the development levels of different regions across the whole country.

Ensuring sustainable development of the country and industry complexes, the transport system, in turn, determines the priorities for sustainable development.

Approaches to assessing the sustainability of the development of the transport system can be carried out by multidimensional assessment: the assessment can be carried out separately for each of the priorities, and then the maturity level of the implementation of the priorities should be integrated into a single final indicator of development sustainability.

For integration, an aggregated weighted by specific gravity values of particular criteria can be used. Assigning specific weights can be done using an expert approach.

As a measure of a single dimension, it is convenient to use cost estimates of the achievements and costs obtained. So, the assessment of environmental results should be based on the current system of payment for environmental damage and penalties for violation of legal requirements. The valuation of social results is traditionally based on the valuation of time spent on passengers and cargo (Savosina, 2018).

The main directions of sustainable development of transport in various countries, regions and cities are characterized by commonality and repeatability of goals, methods and means of improving the quality of transportation, the full use of resource opportunities and resource-saving technologies, rational use of territories and areas, solving political problems, etc.

The logistic approach to projects for the sustainable development of transport systems involves taking into account various externalities (off-system results), coordinating the contradictions of various stakeholders - participants in logistics chains and networks, and the distribution of responsibility.

The criterion for evaluating the effectiveness of the transport and logistics system is becoming multi-faceted. This requires fundamentally new, innovative approaches to the management of transport and logistics activities, taking into account not only internal, but also external costs and results. Therefore, it is necessary to revise the methodology and practice of determining the effectiveness of economic entities of the transport system.

The main idea of sustainable transport development (STD) is the global integration of innovative technical, technological, environmental, economic, social, organizational and managerial and other developments and studies with the aim of creating a comfortable living environment that meets modern and future transport service standards, subject to the rational use of various resources and environmental conservation.

Conclusion

Recommendations for the implementation of sustainable transport development policy relate to reform land use and environmental policies; coordination of horizontal and vertical cooperation between various authorities; sharing responsibility for transport policies of local authorities and cities; supporting regional monitoring and regulatory development efforts; harmonization of transport policies and measures of state-power entities, public institutions, business (including carriers), the media; legal regulation of public transport, emissions management and transport safety; financing, payment for transport services, fiscal and tariff policies.

The implementation of the innovative concept of transport development is possible only if there are trained specialists and managers. In this regard, the transformation of educational activities is of particular importance, including in the direction of communicating environmental competencies to students, aimed at moving from observing and reporting environmental damage to active actions to protect it from negative economic results.

Sustainable development of transport systems is not an end in itself, but acts as a means of achieving sustainable development of the country as a whole and its regions, settlements, achieving the current level of socio-economic and cultural development. This allows us to argue that the sustainable development of transport systems is one of the global challenges facing modern civilization.

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