

ON MAIN DIRECTIONS OF DEVELOPMENT OF THE GLOBAL TRANSPORT SYSTEM AND LOGISTICS

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ABSTRACT

In the article based on the experience of leading countries and the real state of domestic transport the directions of development of the global and domestic transport systems, their interdependence are substantiated, current trends towards globalization and integration of

international transportation markets, logistics processes are assessed. With regard to the renewed transport strategy of the Russian Federation the author calls three forecast scenarios, of which highlights the innovative, and formulates requirements designed to mobilize the resources of the Russian transport system.

Keywords: global transport system, development trends, strategy, modes of transport, competition, innovation, macroeconomics, quality, efficiency.

Background. Transport is the third leading sector of material production. It provides industrial communications of industry and agriculture, provides transportation of goods and passengers, is the basis of geographical division of labor, promoting specialization and cooperation of businesses, industries, regions and countries. Without transport it would be impossible to overcome the territorial gap between production and consumption of goods and services [1]. Transport is divided into land (rail and road), water (sea and river), air, pipeline and electronic (power lines).

Road transport from the middle of XX century became the leading one among other types of land transport. The length of its network reached 27,8 million km, of which about 1/2 falls on the USA, India, Russia, Japan, China. Road transport ranks the first in the volume of passenger traffic – 82% of the world total.

Rail transport is inferior in terms of road transport in the volume of transported goods (9% of the world total). Its global network is 13,2 million kilometers with significant unevenness of arrangement. Although the railways are available in 140 countries, more than 1/2 of their total length falls on the «top ten»: the USA, Russia, Canada, India, China, Argentina, Australia, France, Germany and Brazil.

Pipeline transport develops by rapid growth of oil and natural gas production and the territorial gap that exists between the main areas of their production and consumption. Its share is 11% of global turnover volume with the length of the network of more than 2 million km.

Water transport is primarily characterized by the outstanding role of maritime transport. It accounts for 62% of global cargo turnover, it serves approximately 4/5 of all international trade. Ships transport mainly bulk goods, but «container revolution» has led to a rapid increase in transportation of general cargo – finished products and semi-finished products. The total tonnage of the merchant fleet now exceeds 456 million tons.

Inland water transport is the oldest form of transportation. Now it takes on the length of the network the last place in the world transport system. Its development and placement is in the first place connected with natural conditions – the presence of lakes and rivers suitable for navigation. Amazon, Mississippi, Volga, Ob, Yenisei, the Yangtze, the Congo have a greater capacity than the most powerful railways. In cargo turnover of inland

waterways are distinguished the USA, Russia, Canada, Germany, Netherlands, Belgium, and China.

Air transport plays an important role in international passenger transportation. Its advantages besides speed are quality of supply, geographical mobility, making it easy to extend and modify the route. The network of regular airlines encircles the globe now. Its reference points are more than 5000 airports. The main air powers in the world are the USA, Russia, Japan, UK, France, Canada, Germany.

Objective. The objective of the author is to consider main directions of development of the global transport system and logistics.

Methods. The author uses general scientific methods, economic analysis, comparison, evaluation approach.

Results.

Global transportation system

All means of communication, transport enterprises and vehicles in total form the global transport system. It was formed in XX century and feels the strong influence of the STR, which is expressed in «division of labor» between individual modes of transport, increasing the bandwidth of used routes appearance of fundamentally new means of transport, such as high-speed trains on the hovercraft.

Volume and structure of transportation tend to reflect the level and structure of the economy, and the geography of the network and freight traffic – distribution of productive forces. Quantitative indicators of the transport system are: length of means of communication, number of employees, freight and passenger traffic. Firstly, it refers to the global transport network, the total length of which exceeds 50 million km. Secondly, to the means of transport: transportation of goods by rail is carried out by more than 210 thousand locomotives and millions of rail cars, on highways – over a trillion of cars, by sea routes – more than 90 thousand vessels and airways – more than 30 thousand airliners. Total capacity of all means of transport has already exceeded 2,0 billion tons. Thirdly, transport annually transports more than 110 billion tons of cargo and more than a trillion of passengers. The number of employed in the system exceeds 100 million people.

The main parameters of the global transport system. Change in transport capacity of world economy is characterized by a certain stability in the post-war period: total cargo turnover, and overall passenger traffic grew at about the same rate (with some lag), as well as the total gross domestic product,





calculated in constant prices. During this time, the specific global turnover per 1 ton of manufactured products increased by 1/3, and per capita cargo turnover and kilometer mobility of the population – by 3,5–4 times.

The total length of the transport network by types of means of communication has stabilized in the past decade, at the same time there is its qualitative change: increasing the length of electrified and high-speed railways, highways with improved covering, large diameter pipelines is increasing. The magnitude of the work is great: per capita turnover reached 3,4 thousand passenger / km, volume of traffic has grown by more than 7 times, and by 2020 will grow by 1,2–1,3 times..

There is an intensive transportation structure change between different modes of transport. For example, in cargo turnover the relationship between rail transport and its main competitor – road transport has changed from 4: 1 to 1,2: 1, with a subsequent increase in the share of road transport. The share of pipelines has increased from 4,2% to 12,8%. In passenger traffic, air transport is close to the level of rail – respectively 10 and 10,2% and is ready to overpass it.

A huge influence on the development of all transport modes had a «container revolution», which resulted in transportation of goods carried out in metal containers. New vehicles appeared – container ships and special reloading stations – terminals. It became possible to increase labor productivity on transport by 7–12 times.

The global transport system is not uniform, it is possible to identify areas of economically developed and developing countries, a number of regional systems: North America, overseas Europe, CIS, Asia, Latin America and Australia. The length of transport networks of developed countries is 81% of the world and accounts for 78% of global turnover and about 80% of its value, and its share in passenger traffic is even higher. The density of the transport network in the most developed countries is 50–60 km per 100 km of the area, in developing – 5–10 km. In economically developed regions there are more than 80% of the global car fleet, almost 2/3 of all ports, 3/4 of the global turnover is carried out.

Since the inception transport had a strong impact on the environment. The main air pollutants are road, air and rail transport, these types also create «noise pollution» and require large areas for construction of highways, gas stations, parking lots, train stations, etc. (except for air). Water transport serves mainly as a source of oil pollution of the oceans and inland waters.

Modern urbanization processes are in complex dependence with the development of urban and suburban passenger traffic. Over the past 25 years suburbanization process has led to reduction of the share of trips to city centers from suburban areas of the US from 35 to 10%. On average in the European Union 50% of movement in the cities of the country is made by cars, on foot 12%, 20% – by bus, tram, metro, 15% – on bicycles and mopeds, 3% – urban railway. Experts estimate that the development of informatics and communication reduces the need for business travel by 20–25%, domestic trips – even by 50%.

A special part of the global transport system make transport corridors and nodes. The number of international transport corridors also includes export and transit main pipelines. Created at the end of the last century transport corridors passing through the

territory of several countries combine several modes of transport. From the totality of the routes they turned in traffic control centers and transport hubs, which gradually acquired the tariff policy management functions.

A promising trend is the merging of transport and forwarding and distribution companies. In the nodes, provided with reliable and high-speed transport links – air and sea container lines, large specialized transportation and distribution centers of international importance (Paris, Marseilles, Frankfurt, Munich, etc.) are created.

In the transport system nodes have the function of regulating valves. Failure of one of the valve can lead to problems for the entire system. Major nodes are always the major cities because they attract trade, it is convenient to develop the industry, and transport terminals themselves provide many jobs. Many cities arose at the intersection of land and waterways, i.e. as transportation nodes.

The impact of the state on development and operation of transport has its own purpose. It is widely used as a tool of regional policy. In the face of increasing redundancy and contradictory development processes protectionist and discriminatory economic, fiscal and legal measures of the state to mitigate competition and protection for national-transport companies are enhanced. In particular, it concerns the use of «own» vehicles for expansion of «invisible» export (transportation of goods of foreign charterers, etc.). Or take «deregulation» of air transport in the United States, the emergence of charter airlines outsiders which sharpen competition in the air freight market, leading to a decrease in payload of aircrafts. «War of flags», appeasement policy towards «convenience» flags cause disruption of the freight market, lead to underload tonnage. Of 690 million tons of world fleet deadweight about 180 million tons are redundant (of which 80 million tons are laid up), even container vessels are used only by 60–65%.

Stricter environmental regulations and measures significantly increases the redundancy of transport capacities and cost of transport process. Given the high cost of the territory more than 10 million tons of tanker resource is used as a floating oil storage capacities in the coastal waters of some countries (e.g., Japan). Tankers play also a role of grain storages in the waters of ports in developing countries due to the fact that the local storage facilities are not prepared for such a rapid increase in grain import.

The interweaving of these factors causes complex and contradictory effect on development of the global transport system. On the one hand, the general trend is acceleration of transport process: high-speed railways, container traffic, high-speed specialized vessels, on the other hand – reduction of the running speed of vessels to merge the surplus tonnage, reduction of speeds on other modes of transport in order to reduce energy consumption. Conflicting and complementary trends are formation of powerful poly main lines, transport corridors for increasing efficiency of the transport process. On the other hand, dispersion of traffic flows, construction of relatively small highly specialized vehicles, containers with a clear «target» purpose, development of feeder means of communication providing supply-delivery.

Contradictions between development of rolling stock and fixed equipment, between linear and nodal

elements of the system are intensifying. The capacities of ports usually lag behind transportation, port hierarchical systems are formed with the purpose of investment concentration, at the same time the competition between them increases. There are disparities between the ports of countries of origin and ports of recipient countries. Hence – the increasing trend to avoid port facilities, organize reloading-free systems (vessels «river-sea», barge carrier, ferries, ro-ro vessels, etc.). A major problem of global significance has been until recently the lack of deep-water ports on the Atlantic coast of the USA (they accepted vessels up to 70 thousand t). The far-reaching consequences is the fact that the share of developing countries in world maritime tonnage is only 25%, while in the global cargo dispatch – 50%.

One reason for redundancy of transport capacities is increased competition between rail and road transport (in the USA the costs of motor transport is 60%, while the share in cargo turnover is 26%, and the share in energy consumption of transport is 85%). From «interception» of goods by road transport and to «invasion» of the car in the sphere of railway the US economy loses, according to some estimates, about \$2 billion annually.

Cost characteristics of transportation of any product (transport rate) are reflected directly in its final price, are added to the cost of production, affect the competitiveness of the product and its area of distribution. Transportation costs in passenger traffic limits the possibilities of travel for population, and in many cases for some people with low incomes make these trips unavailable. Cheapening of passenger traffic, mitigating these limitations, has not only great social, but also economic importance. Public transport is subsidized mainly by the state, regional and local authorities. However, their participation in this is different. In some countries, government investments provide the full amount of one-time and ongoing costs (Belgium, Netherlands), in others they are practically not used (Canada, Denmark, United Kingdom).

These trends and processes, closely interacting with the world development process, are typical for modern and future traffic conditions, require careful research on an interdisciplinary level. Meanwhile, the general level of exploration of the world transport as a system began to decline.

Transport system of Russia

In the Russian Federation transport is also one of the basic sectors of the economy, the most important part of the industrial and social infrastructure. Transport communications unite all parts of the country, are an essential condition for its territorial integrity, unity of the economic space. They connect Russia with the international community, help its integration into the global economic system.

The place and importance of transport are confirmed, among other things, by its relative share in the fixed productive assets of the country (in 2012 – 29 per cent), a significant proportion of transport services in the gross domestic product (in 2013 – 9 per cent), investment on development of industries (in 2013 – 11,4 per cent) and the number of employed workers (in 2013 – 6,8 per cent), as well as in consumption of energy, metals and a number of other indicators characterizing the domestic economy.

Availability of transport among the priority sectors emphasizes the degree of its addiction to

solving the most pressing problems of the day. The Russian economy with all its subordinate sectors faced a system challenge, nature and level of which are determined by a combination of three fundamental factors.

The first factor is increasing global competition. The second is increasing role of human capital in the socio-economic development. The third factor is exhaustion of sources of income of export-raw type, based on intense buildup of fuel and raw exports.

At the same time in Russia arose significant limitations of economic growth due to insufficient development of the transport system. Today's volume and qualitative characteristics of transport, especially of its infrastructure, do not allow to fully and effectively meet the challenges of the modern economy.

Basic system-wide problems of the transport sector: presence of territorial and structural imbalances in development of transport infrastructure; inadequate availability of transport services for the population, labor mobility; poor quality of transport services; low level of export of transport services, including the use of transit potential; a certain lack of transport safety; strengthening of negative impact of transport on the environment.

Another serious problem is the lack of competitiveness of domestic companies and the entire transport system of Russia in the global transport market. This is caused by the already mentioned reasons, and insufficient capacity of domestic transport companies to compete on the world market, including to use effectively geopolitical advantages of Russia in international transit traffic. Technical and technological parameters of international transport corridors of Russia do not provide their competitiveness. In addition, integration into the global and regional markets of transport services would mean increased competition, greater access to the Russian market to foreign carriers, removal of administrative and tariff barriers will only complicate the situation with domestic transport companies.

Global trends in development of transport

The analysis of global trends shows that no country is able to control the risks of its own economy without strong transport positions. The revealed features of transport development show that the period of protection with respect to its certain forms and carriers is over. At present, the global transport system is characterized by a high dependence on information technologies and is developing in the following areas: increasing the capacity of transport routes, enhancing movement safety, emergence of fundamentally new vehicles, increasing their capacity and carrying capacity, speed of movement, timing, rhythm and environmental performance. New customer's requirements for the quality of transport service put the costs to the second place.

The efforts of the majority of countries are aimed at improving the competitiveness of national transport and abandonment of the quota system, as well as tariff and other restrictions. They are replaced with harmonization of transport legislation; transport services market has become complicated, all segments of the transportation process and logistics have become integrated. As a natural result – development of a new type of transport infrastructure: transport-storage and commodity transport systems, which have formed a united system of interaction;



transport centers have become operating elements of the system, allowing to optimize the «through» rates.

This led to transition of profitability point from processes of physical transportation in the area of transportation transport and logistics services. On the changing background the requirements for environmental technologies are enhanced. Hence the desire to maintain a reasonable share of the transport component in the price of final products under strict standards on environment and safety.

In the long term further development of scientific and technical progress in transport is expected. The structure of the network of means of communication will undergo significant changes. Scientific and technological progress will significantly improve economic performance, improve customer service quality and traffic safety. The widespread use of marketing, market research, the introduction of requirements for accounting, the use of simulation, etc. are outlined. Development is expected on the whole network of Raylinka computer system (interconnecting railways, customers and banks) or other equivalent, electronic system of commercial exchanges. The length of low-density and non-profitable railway lines and areas will be reduced. At the same time, it is assumed to construct several new structures, mainly highways. It is necessary to continue working to ensure the compatibility of information systems to link the national computer networks.

Significant changes will occur in the park of vehicles. Their number increases slightly, and significantly increases the proportion of advanced types of traction. The share of specialized rolling stock, its load capacity and unit power will increase. Even now, scientists and inventors developed innovative vehicles that capture the imagination. Imagine that more than a billion cars that travel around the world, are working without emissions for 100 years and only using 8 grams of fuel each! In the USA, for example, a new type of car engine is created from one of the densest material known in nature – thorium, which has a great potential for production of heat through the use of laser nanotechnologies.

Certainly promising innovative vehicles are made of heavy-duty materials and having the most modern electronic equipment airships, underwater cruise and cargo ships (especially in the Arctic), string transport, private spacecraft up for tours to the moon and Mars [2].

The new domestic strategy

In transition to intensive, innovative, socially oriented type of development Russia is striving to become one of the leaders of the global economy, which requires the active position of the state to create conditions for increasing the level of transport services, reduce the total costs of society, dependent on transport, the growth of competitiveness of the national transport system and quality of living through access to safe comfortable transport services, enhancement of the innovation, social and environmental aspects of the industry development, transformation of geographical features of the country into its competitive advantage.

The new version of transport strategy of the Russian Federation up to 2030 approved by Resolution of the Government dated June 11, 2014 № 1032-r. It has been prepared taking into account the strategy of innovative development of the Russian Federation for the period up to 2020, the

development strategy of the Arctic zone and ensuring national security, development strategy of the shipbuilding industry, transport engineering, aircraft industry, automotive industry and other sectoral strategies in the field of industry, energy, forestry complex and agriculture, the strategy of social and economic development of regions of Russia. At the same time as optimal for linking the transport system development strategy with the regional priorities is recognized the federal district level.

The goals of modern transport strategy:

- formation of a single transport space of Russia on the basis of transport and economic balance of the country, providing a harmonious advanced development of efficient transport infrastructure;
- ensuring availability, scope and competitiveness of transport services for shippers to meet the needs of innovation development of economy;
- ensuring availability and quality of transport services to the public in compliance with social standards, full satisfaction of its growing demand for mobility, elimination of restrictions on development of existing and development of new territories, and increase in affordability of socially important transport services;
- integration into the world transport space, implementation of the transit potential of the country – formation of a world-class transport infrastructure and the transformation of the export of transport services into one of the largest sources of income for the country;
- improving safety and sustainability of the transport system – efficient operation of emergency services, civil defense, units of the special services and increased mobilization preparedness – creation of necessary conditions for an appropriate level of national security and reduction of the risk of terrorism;
- reduction of negative impact of the transport system on the environment.

Transport infrastructure development plays a key role in implementation of the transport strategy. The main areas here for the individual modes of transport are:

- In the sphere of railway transport – development of speed (160–200 km / h) and high speed (250–350 km / h) passenger traffic;
 - From the standpoint of road infrastructure – to achieve consistency between supply and demand of the road network capacity in terms of growth of the vehicle fleet, based on the long-term level of motorization of the country: about 80 cars per 100 households (300 cars per 1000 inhabitants);
 - In the field of air transport – creation of circuit protection systems of airfields and landing glide paths;
 - In the field of maritime transport – introduction of an automated pilotage systems using satellite navigation systems and creation of electronic maps of inland waterways;
 - In the field of pipeline transportation – pipeline transport infrastructure development in the eastern regions, in accordance with the priorities of reliable gas supply to Russian consumers and diversification of energy exports, taking into account the requirements of legislation on nature protection; increasing the throughput capacity of the Baltic Pipeline System to 62 million tons of oil per year [4].
- Based on the forecasts of possible trends and benchmarks in recovery of the Russian economy and

transformation of the social sphere three scenarios for the future of the country's transport system can be offered: inertial, energy and raw; innovative.

An innovative type of economic growth, which is in all respects preferable, puts forward new requirements for the transport and main parameters of its development, taking into account the following circumstances:

1. When saving the main functions of the transport system (instrument of national unity of commodity markets and interconnection of regions, a factor that creates and organizes a common economic space; a source of development of the territorial division of labor and implementation of comparative competitive advantages; the condition of the country's security, means of movement and growth of population mobility) scope, direction and strategy for the development of transport should be of outpacing character as compared with the parameters of the socio-economic development of the country as a whole. Only with this approach, transport will not be a deterrent to socio-economic development of sectors and industries, social services and consumer markets.

2. In the context of globalization of the world economy, transport along with financial and information sphere acts as a major lever of integration processes. Its particular role is determined by the fact that due to transport market economy is structured, a single economic space is formed.

3. The problem of raising the competitiveness of goods and services for the Russian economy is key at this stage. This may involve the use of its transit potential, associated with the special geographical situation of the country as a natural transport corridor linking the European, Asia-Pacific regions and America (primarily the creation of a reliable and well-functioning transport mechanism between Europe and Asia along the Trans-Siberian route, reunited with the Trans-Corea railways and main lines of Mongolia as one of the main routes of delivery of containers from China to Europe, and eventually the construction of the Asia-Pacific railway: Singapore – Bangkok – Beijing – Yakutsk – a tunnel under the Bering Strait – Vancouver – San Francisco); improving the safety of the transport system; reducing the harmful effects of transport on the environment [5].

4. The emerging recent openness of the national transport market makes new demands on the level of competitiveness of transport. Clearly are revealed the limitations associated with the lack of development of an integrated transport system, differences in tax, tariff, investment policy, which indicates the absence of a common transport policy, effective mechanisms of its formation and implementation [6].

5. In a modern transport system the spatial mobility of the population occupies a special place, which is not adequate to the requirements of not only the innovative scenario of economic growth, but also the needs of the market economy. Studies show that, in general, mobility of the population in Russia is

much lower than in countries with developed market economies. It is estimated that up to 1/3 of the regions is below the poverty line, their inhabitants do not have the economic opportunity to leave these places, which, in particular, can serve as an explanation as to why there is no convergence in income of regions [7].

Conclusion. The transport system of the Russian Federation is a part of the global transport system. In the next few years our country may face serious infrastructure constraints of transport accessibility of individual regions and movement of goods in international and domestic traffic. The loss of individual perspective world commodity markets is possible. The transport system can become a brake to economic growth.

The implementation of the renewed transport strategy of the Russian Federation, coordination on the basis of its provisions of actions of all branches and levels of government, business and various sectors of society will presumably ensure the most efficient use of transport capacity for socio-economic development of the country, the solution of socio-economic problems mentioned in the article.

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Article received 25.11.2015, revised 09.06.2016, accepted 10.06.2016.

