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THE ANALYSIS OF THE WORLD EXPERIENCE IN THE DEVELOPMENT OF TRANSPORT

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Examples of advanced infrastructure development are the USA until the middle of the XX century and modern China. Currently, the US is characterized by a model of catch-up development.

The modern transportation network of the USA is the most powerful in the world and includes all traditional modes of transport. Highways have the greatest length in the USA (more than 6.5 million km). These indicators are explained by the large share of automobile transportation (both passenger and freight), as well as the high level of motorization of the population (more than a third of American households have 2 cars).

The USA has the longest pipeline system in the world – about 1.3 million km (oil pipeline system – 325 thousand km, product-wire infrastructure – 245 thousand km, gas pipelines – 549 thousand km), this is due to the long history of the formation of the oil and gas industry, significant dispersion of the resource base, high level of energy consumption.

Recent years have been characterized by significant changes in the US economy and its transport industry, which have led to increased competition in the transport market, an increase in traffic volumes and transport costs, and increased requirements for the quality of transportation. These factors significantly affect the functioning and development of railway transport. U.S. railroads are the world's leading and most efficient freight transportation industry. The peculiarities of rail transportation in the United States are the absence of a shortage of capacity, the presence of parallel lines on which freight transportation is carried out by vertically integrated companies, and passenger transportation is carried out by a separate company.

The US rail transport system includes 7 major first class roads. This group includes companies with annual revenue of at least \$490 million. Each such

railroad operates in several states over thousands of miles of track. At the same time, they own both infrastructure and locomotives. They account for the bulk of the work: about 68% of freight train mileage, 88% of employees and 94% of income.

For a long time, the railways of the United States suffered not from a shortage of infrastructure, but from its redundancy. The maximum length of the operational railway network was recorded in 1916, which is more than 400 thousand km on Class I roads. According to the Association of American Railroads, this indicator has been steadily decreasing since then, but is currently the highest in the world and is more than 200 thousand km.

At the same time, small Class II railways operating on short segments are the most numerous in the USA. Many, in fact, on the access roads of enterprises. There are over 600 such "first and last mile" roads. Together, the freight railways of the United States form an integrated system with a length of almost 140 thousand miles (225.3 thousand km), which in 2019 brought revenue of \$ 80 billion. In total, the share of railways accounts for about 40% of traffic in the country [1].

If 40 Class I railways were registered at the beginning of the 1980s (18 of them are large), at present there are only 7 of them left.

This gave more opportunities for capacity consolidation, opened up opportunities for integrated planning of operations and investments.

As for short lines, their activities are supported by the state. In March 2020, the US Department of Transportation (USDOT) announced the allocation of grants totaling \$248.5 million to modernize and improve the safety of railway infrastructure.

As part of the provision of long-term low-cost loans for short lines and regional transportation, RRIF Express has allocated over \$1 billion in recent years.

In the conditions of competition, railway companies are forced to reduce the cost of transportation, trying to compensate for the loss of coal transportation at the expense of other goods – cars, agricultural and chemical, but intermodal transportation, door-to-door and just-in-time cargo delivery with the prospect of an increase of 5-7% are of particular relevance from the point of view of traffic volume growth per year.

In addition to optimization and innovation, U.S. railroads have shown a remarkable ability to adapt to changing market conditions.

In parallel with deregulation in the 1980s, two important events took place in the country's freight transportation market, which largely predetermined the development of freight transportation.

Firstly, it is a shift in international trade from Europe to Asian countries. Imports from Japan, Taiwan and South Korea arrive in the United States at ports on the western (Pacific) coast, and then move to densely populated cities in the east.

American railroads responded to this challenge with the introduction of Double-stack container trains. They have reduced the cost of intermodal transportation by almost half and allowed us to successfully compete with road

transport. As a result, containers are now the fastest growing and most profitable segment of the U.S. railroad business.

In 2013, revenue from intermodal transportation (about \$15 billion) exceeded revenue from coal transportation (\$14.3 billion), which has been the main cargo for a long time. Intermodal transportation in the USA breaks records almost every year. If we take the time interval from 1980 to 2018, they grew from 3 to 14 million TEU, that is, almost 5 times. According to the Intermodal Association of North America (IATA), 54% of the total volume is international cargo.

The second important event that contributed to the development of the US railways was the rapid expansion of coal mining in the Powder River Basin (Montana).

Despite the achieved high level of development of all types of transport infrastructure, federal budget investments in transport infrastructure amount to 3% of GDP. At the same time, the private sector has taken a leading role in infrastructure development.

Historically, access to the railway network is an important driver of long-term growth. Studies on the economic impact of railway expansion tend to consider population growth as their outcome of interest.

High-speed (HS) rail investment provides economic benefits if major economic hubs anchor the routes. Ahlfeldt and Feddersen [2] find that 10 percentage point faster growth in market access following the construction of a HS railway between Cologne and Frankfurt leads to 2-3 percentage point higher GDP per growth during 1992-2006. Similar results are found by Carbo et al. [3] for the HS rail corridor connecting Madrid to Barcelona. The main difference between traditional and HS railway investment is that while traditional railway also serves the purpose of shipping goods, HS railway eases passenger traffic and business trips. Therefore, while the first-order impact of traditional railway investment is likely to be on the manufacturing sector, the most likely consequences of HS railway investment are trade in services and a reorganisation of production in multi-establishment firms. A cautionary note is that the cost of HS railway investment is high, both for the initial development and for the subsequent operation of the lines. Most currently existing lines connect major cities with substantial passenger flows between them. The costs and required subsidies vary substantially even between these major lines [4], which means that any development requires careful evaluation of the potential demand.

The effect of shutting down a railway is negative. Most academic studies focus on the development of new infrastructure, few studies analyse the impact of disinvestments, partly due to the rarity in the occurrence of disinvestment projects. The economic interest for this type of projects should be high given that current infrastructure faces the risk of becoming obsolete in face of newer technologies.

An example of synchronous infrastructure development is the experience of Germany. The development of transport in Germany is inextricably linked with the increase in domestic and foreign trade. Today, the country's transport system is a

complex intersectoral complex, one of the leading in the world. There are about 2 km of various roads and communications per 1 sq. km of territory.

The German railway system is the longest in Western Europe (more than 37 thousand km), represented by a large vertically integrated holding Deutsche Bahn AG (DB), divided by type of activity into 3 groups: passenger transportation, freight transportation and logistics, infrastructure maintenance. Deutsche Bahn AG has competitors in passenger and freight transportation.

After the unification of Germany and the GDR, in the context of the general deregulation of the public sector, the reform of railways also began, since excessive regulation proved ineffective and led to two negative consequences: transportation tariffs exceeded market prices by 20%, German goods could not be competitive due to the opening of national markets and the inefficiency of railways. Based on this, the following recommendations were developed:

- exclusion from government railway management functions;
- removal of responsibility from railways for fulfilling the tasks of the state in the economic and social spheres;
- separation of infrastructure and transportation activities;
- introduction of competition in the railway transportation market [5].

Reform goals:

- creation of a market commercial company in the form of a joint-stock company on the basis of two state-owned companies;
- reduction of government spending on the maintenance of railways;
- stabilization and increase of the share of railways in the total volume of traffic;
- opening access to infrastructure to third-party carriers [6].

The results of the reforms allow us to conclude that all the goals have been achieved to one degree or another. The liberalization of the industry has led to the development of competition, its scale is increasing every year. The share of rail transport in the total volume of passenger and freight traffic has increased. Competition in subsidized local transport has reduced government spending and attracted passengers to rail transport.

Germany has a well-developed transport infrastructure, and the private sector is capital-intensive, while the management and financing of the bulk of infrastructure construction costs is carried out by the state through DB. The business owns roads, ports, and also manages transportation.

In modern China, there is an explosive growth of transport infrastructure. Over the past 10 years, China's comprehensive three-dimensional transport network has accelerated its development, China has built the world's largest network of high-speed railways and highways, as well as a group of world-class ports. Flights and sea routes closely connect China with the world. Integrated transport network China has exceeded 6 million kilometers. The operational length of the railways has reached 150 thousand km, of which 40 thousand km is accounted for by a high-speed railway, which is comparable to the length of the Earth's equator. The length of expressways exceeded 160 thousand km, and the density of the road network reached 55 km per 100 km², which is 24.6% more than

in 2012. In 51 cities of China, urban rail transport has been opened and put into operation, while the total mileage has increased 4.2 times compared to 2012. The total number of civil aviation airports has reached 250 units, more than 3,000 new routes have been opened, as a result, the total number of routes has reached 5,581 units. The shipping route of the inland waterway reaches 128 thousand km and has 2,659 berths with a carrying capacity of 10 thousand tons and above [7].

An integrated transport system with huge scales and uninterrupted internal and external communications effectively supports development China as the world's second largest economy and the world's largest commodity trader. The main indicators, such as passenger and cargo turnover of railway, automobile, water transport and civil aviation, as well as cargo turnover of ports, the volume of China's postal express delivery has been one of the first places in the world for many years in a row. In 2021, on average, more than 69 thousand ships were serviced daily at ports, 26,800 aircraft were serviced at airports, and almost 300 million express shipments were processed. During peak hours, on average, more than 10 thousand passenger trains run daily on the railway, and the capacity of the expressway exceeds 60 million units of vehicles. China has become one of the busiest countries in the world in the field of transport.

Transport has shortened space-time distances, accelerated the flow of goods and personnel, and profoundly changed the face of rural areas and the way of life of people in China. Railways covered 81% of the counties of the country, and the high-speed railway covered 93% of cities with a population of more than 500 thousand people. At the end of 2021, the number of passengers served by high-speed rail reached 2.53 billion, which is five times more than in 2012. We can say that the concept of "seeing China on a high-speed railway" has become a reality for ordinary people who enjoy their wonderful lives. Online taxi booking covers more than 300 cities China, while the average daily volume of orders is about 21 million times. Door-to-door passenger transportation services have been launched in 27 provinces, which fully meets the needs of customers. China is diligently promoting "paperless travel", and at this time electronic tickets have reached full coverage in the field of railways and civil aviation. They are also actively promoting "universal" tourist services, accelerating the development of combined air and rail transport, expanding mutual recognition of safety checks of railway and urban rail transport.

The development of transport in China not only effectively guarantees the uninterrupted movement of domestic and international traffic, but also makes an important contribution to the development of the world economy. China has become the world economy with the highest degree of maritime communication and trade in goods. China has signed bilateral air service agreements with 128 countries and regions and opened 895 international air routes. Under normal conditions, Chinese airlines operate international scheduled passenger flights to 153 cities in 62 countries around the world, at the same time, about 5,000 international cargo flights are operated weekly, which effectively ensures the stability of the global production chain and supply. China's international shipping volume is 1/3 of the world's shipping volume. In addition, China actively promotes

cooperation in foreign railway projects and consistently opens the Mombasa-Nairobi railway, Djibouti–Addis Ababa and China-Laos Railways [7].

Large transport projects abroad often bring both direct and indirect profits, new sources of financing are attracted, including public-private partnerships.

The analysis of the world experience in the development of transport allows us to identify the following trends:

- the state's efforts are aimed at increasing the competitiveness of harmonized transport systems by abolishing quotas, tariff and other restrictions for modes of transport and carriers;
- there is an integration of elements of the transportation process and logistics in the conditions of digitalization and complexity of the transport services market;
- transport (logistics) centers have become managing elements, transport corridors have turned from a set of routes into a system of managing transportation centers and transport hubs;
- the competitiveness and quality of transport services are growing.

New technologies should be introduced in the transport infrastructure, taking into account the main trends of world development. We will highlight the main technological trends and technologies developed in the world that will affect the development of transport infrastructure:

1. New concepts and technologies of cargo and passenger transportation: high-speed railway transport:

- magnetic levitation transport, or Maglev; Actively developed and operated in the world since the 1980s, Technology is at the stage of concept;

- hyperloop (hyperpaths) — vacuum trains project [8].

Technologies are not currently represented in Kazakhstan.

2. Unmanned passenger and cargo transport.

3. "Uberization" of passenger and cargo transportation.

4. General Autonomous electric Vehicles.

5. The spread of satellite technology.

6. Targeted delivery to end users, due to the growth of the e-Commerce market.

7. The use of digital technologies: the introduction of the Internet of things in transport, the formation and use of big data, the concept of Maas (mobility as a service), the introduction of blockchain technologies.

References

1. Lessons from US Railroads for Ukraine. [Electronic resource]: URL: https://biz.censor.net/resonance/3190852/uroki_jeleznyh_dorog_ssha

2. Ahlfeldt G. and Feddersen A. From periphery to core: Measuring agglomeration effects using high-speed rail [Text]: Journal of Economic Geography. Vol. 18/2. pp. 355-390. - 2018.

3. Carbo J. et al. Evaluating the causal economic impacts of transport investments: Evidence from the Madrid-Barcelona high speed rail corridor. [Text] // Journal of Applied Statistics.- Vol. 46/9. - pp. 1714-1723. - 2019.

4. Albalade D. and Bel G. High-speed rail: Lessons for policy makers from experiences abroad. [Text] / Public Administration Review. - 2012. - Vol. 72/3. - pp. 336-349.

5. Peter B. Railway Reform in Germany: Restructuring, Service Contracts, and Infrastructure Charges. [Text] – Berlin: Technische Universität. - 2008. - 236 p.

6. Friebel G., Ivaldi M., Vibes C. Railway (de)regulation: a European Efficiency Comparison. [Text] / IDEI. - 2003.

7. Transport development is at the forefront of China's modernization. [Electronic resource]: URL: http://kg.china-embassy.gov.cn/rus/ggwj/202209/t20220923_10770762.htm

8. Golskay Y.N. Modern trends of development of transport infrastructure. [Electronic resource]: IOP Conference Series: Materials Science and Engineering. doi:10.1088/1757-899X/667/1/012026. - 2019.