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ABSTRACT

The essence of roundabout methods of production, according to the author, is that the ultimate goal of the process, which is to provide consumer goods, is achieved through creation and sales of intermediate products, which are capital. The use of such techniques improves efficiency of production, so the growth of «roundaboutness» is a dominant trend of economic development. The specifics of transport

aspect in this case is the fact that transport connects various stages of production chain, located at different points in space, and thus has spatial roundaboutness effect, which is the most pronounced in today's global economy. The effectiveness of development of global economic production chains increases with the absence of barriers to movement of goods, capital and labor and with availability of market pricing, not distorted by regulatory action.

Keywords: transport, roundabout production, spatial roundabout effect, capital, global economy.

Background. *The concept of roundabout production methods was introduced in the economic theory by representatives of the Austrian school. The essence of roundaboutness is that the ultimate goal of production, which is to provide consumer goods, is not achieved directly, but through a number of stages in creation of intermediate products (means of production, means of production for production of means of production, etc.). The entire set of intermediate products arising at individual stages of a roundabout way to a final product, is capital [1, p. 49], which is formed by eliminating current consumption for the sake of future benefits [2, p. 280].*

«Efficiency of roundabout methods of production ... is higher, so consumers after deployment of these processes will have more goods, offsetting the rejection of current consumption» [3, p. 47].

The growth of roundaboutness of production is a dominant trend of economic development. Although in some cases, technical and technological improvements can lead to elimination of some parts of production chain (reduction of roundaboutness), further development, as a rule, leads to new growth of roundaboutness already on the basis of improved technical and technological base [1, pp. 621–622].

Reduction of roundaboutness may also occur during periods of economic regression (for example, naturalization of economy in medieval Europe [4]), which are only temporary deviations from a general development trend. Therefore, in such cases, after a temporary decline in roundaboutness its growth resumes.

Roundaboutness growth, in addition to replacement of labor costs with capital costs, reduces transformation costs, but increases transactional costs¹ [5, p. 218–220]. In concrete terms, and taking into account both trends, an optimum level of roundaboutness is set, providing minimization of overall costs.

In the current era of knowledge economy a particular importance has been acquired by growth of roundaboutness of production through development of human capital (in particular, this is reflected in average duration of training, creation of continuous education and training of employees, covering the entire life cycle of their employment).

Objective. *The objective of the author is to define transport aspect of roundabout production approach, to define transport developments in terms of roundaboutness.*

Methods. *The author uses general scientific methods, economic and historical comparison, economic evaluation method, general analysis.*

Results.

1.

Transport activity in overland movement of goods in terms of growth of roundaboutness historically focused on replacement of portage by porters (which was used for long distances as long ago as in the Middle Ages, [4], and in North America until its opening by Europeans and appearance of horse-drawn transportation [6]) with first pack transport and then with animal-drawn transport. Animal-drawn transport was later replaced by rail and road, which, in turn, were improved and became more complex, turning to be more capital intensive, productive and efficient.

A good example is transition of railway from steam traction to electric one. In the first case the energy contained in fuel is converted into energy used for train traction directly in the locomotive, then in electric traction additional, highly capital-intensive roundabout chain lines up. There the fuel energy is converted into electrical energy at power plant, from where it comes into traction power system of railways, and only then to a locomotive, where it is used for traction of trains. Such capital-intensive industrial chain elongation could significantly improve energy efficiency and overall efficiency of rail transport. For example, in the period of mass electrification of railways, characterized by implementation of other sectoral innovations, and only from 1960 to 1967, the share of electric traction in freight turnover had doubled. As the result, production assets of the industry grew by 1,4 times, net cost of transportation decreased by more than 14%, profit increased by almost 86%, profitability grew by more than 1,5 times [7, p. 326].

An interesting example of increasing roundaboutness of railway transport production is a deviation of transit freight flows from the «shortest» routes to the «cheapest» but circuitous routes, which as a rule are more capital-armed (electrified, double- or multitrack, etc.) [8, 9]. This efficiency increase is achieved by increasing capital intensity of transportation process, while increasing its spatial roundaboutness, as the route is extended. The specifics of the transport aspect of roundabout production methods is associated with spatial roundaboutness.

¹ Transformation costs are associated with physical conversion of resource into a finished product, i.e. directly with production. Transactional costs are associated with preparation, conclusion and implementation of market transactions. — author's note.



Transport itself, as a specific element of production chain («continuation of production process within circuit process», if we use Marxist terminology [10, p. 11]), contributes to increase in roundaboutness of production. Thanks to transport, local production resources may be replaced with more efficient (by criterion «assortment–quality–price range») imported resources, and finished products may be sold in other, remote regions where they have a higher value. Thus, there is an increase in roundaboutness of production in a literal, spatial sense, as supply chain is lengthened in kilometers.

This increase in roundaboutness is manifested in the growth of medium-range of cargo transportation. Analysis of the dynamics of this index for the largest railway systems of the world (Russia and US) showed that for super long («secular») period, it was increasing on average by about 1% per year [11]. The reduction of medium-range of cargo transportation in certain periods of time, due either to emergence of more closely spaced sources of raw materials and development of local production, which allows to replace supplied products, or economic setbacks during post-war devastation, or at the time of economic crisis, was not long and was replaced with resumption of a dominant trend.

Even more vivid picture of the growth of spatial roundaboutness of production seems to be provided by analysis of the dynamics of average total range of movement of goods, for which it is advisable to establish monitoring [11].

With creation of a global network of railways [12, 13] and development of steam shipping traffic in XIX century the global economy was formed for the first time in the history, the basis for which was economic space of the British Empire – «mistress of the seas» and homeland of rail transport. The development of transport, ensuring a radical price reduction of transportation [14], made it appropriate to carry over long distances even relatively inexpensive items. As a result, previously unprecedented deepening of specialization and co-production became possible, it marked creation of the first global division of labor. Within its framework «North» (first of all – Western Europe) specialized in industrial production and «South» (Latin America, Australia, and others.) specialized in raw products, and both «North» and «South» experienced strong economic growth [2, p. 36–37]. «For the first time in the history the economy of various countries was bound together by international trade, covering all products» [2, p. 46].

Russia, where the last third of XIX century was a period of rapid railway construction, integrated successfully into the global economy, primarily as an exporter of agricultural products. Thus, the Russian grain exports from 60-ies of XIX to the early XX century, had grown by about 5 times. And domestic production became more and more roundabout, capital-intensive, specialized, efficient. Railways that had linked all major economic regions of the empire and gave an opportunity to develop for a number of new territories, did away with remnants of natural economy and turned the country into a single market [15, 16].

2.

The development of transport was necessary, but certainly not a sufficient condition for formation of rapidly growing global economy. A key role was played by socio-economic institutions, that comprised as main elements free trade, gold standard and international property rights [2, p. 52]. In Russia, institutional changes that had occurred as a result of the reforms

in 1860–1870s, also had a great significance for development of economy and transport [16, 17].

The First World War led to the collapse of the then existing global world economy, but it again, at a qualitatively different level, was revived in the second half of XX century. The «division of labor due to fragmentation of production processes has even more deepened: countries and regions specialize now not just in cars and shoes, but in their components» [2, p. 37].

During that period, international division of labor develops in three directions. «North» specializes in production of goods and services requiring high qualification. Asian countries where there is a surplus of labor specializes in labor-intensive industries. The countries of Latin America and Africa, which have significant natural resources, focus on supplying advanced and rapidly developing industrial countries with commodities [2, p. 129].

The Russian economy within the modern system of international division of labor also has a raw material specialization, which, however, has already exhausted itself, and should be supplemented by high value-added products. Taking into account the available scientific and creative capacity and see its unique geographical position Russia, in particular, could specialize in provision of transport services for global economic relations.

Solving such problems requires priority attention to preservation and development in the country of human capital, market institutions, deepening of integration in the global economy and an understanding of its specificity.

In a global economy spatial roundaboutness of production has reached an unprecedented scale. Production of most goods, the turnover of components necessary for it (raw materials, semi-finished products, equipment, labor) covers all continents. Within the framework of world market individual countries and regions are involved in this production and exchange process basing on their comparative advantages, getting their own benefit and contributing to the growth of global economic efficiency, for maximization of which the absence of barriers to free movement of goods, capital and labor is important. This global process is cross-linked with transport and communication systems.

The growth of spatial roundaboutness can both replace and supplement the growth in capital intensity of production. Substitution occurs, for example, when instead of applying additional labor-saving capital in the region with high labor costs the individual elements of production chain are moving into the region with cheap labor, thus reducing the cost of final product. An example of a supplement is movement of raw materials in the region with high capital intensity, which helps to make of this raw material a greater amount (due to deep processing) of qualitative final product, that is, to increase profitability. The feasibility of such movements depends on relative prices of resources and final products in different regions and the level of transport costs, lack of price distortions arising from the regulation of prices and tariffs.

This value is transferred from final products to intermediate, produced at all stages of roundabout production chain.

Value (and therefore price) of final results of the production chain (which are consumer goods) is a result of evaluating the usefulness of these goods from the point of view of consumers; value of resources directly used for production of consumer goods, is determined by the value of consumer goods; the value of intermediate products needed to produce the

resources used for manufacturing of consumer goods is determined by the value of these resources, and so on, until the beginning of roundabout production chain.

Within this process, the values of transport services, of transportation, as well as of resources used for its provision, are formed.

A mandatory economic condition for transportation of goods (whether it is a final product (consumer amenities), or intermediate product) is the excess in value of the goods at destination point over its value at departure point, that is, the value of goods as a result of displacement is increasing [18]. This increase in value of goods as a result of displacement determines the value of transport services in the chain of roundabout production method. In turn, the value of transport services is transferred to the value of resources used for their provision [19, p. 90].

Simultaneously with transfer of values within and through stages of global production, the total profit generated by the supply chain is distributed. In the long run period, with market mechanism undeformed by regulation, the profitability of production at all stages should tend to equalize. But it is a specific trend that, at first, does not mean equalization of profitability by industry and companies in general, since different industries and companies are involved in implementation of different production chains to varying degrees, and secondly, does not mean equality of profitability at all stages of even a single production chain at any given time. The latter is linked in particular to the fact that the value of specific resources for production of relatively scarce goods and services (such as services provided under the conditions of limited carrying capacity of transport infrastructure) will increase and the profitability of respective intermediate products or services (in the above mentioned case of transportation services) should grow (attracting additional investments) to eliminate their deficits.

If the prices of relevant products or services are regulated, or whether they are «public goods» produced by budget financing, elimination of their deficit due to market self-regulation does not take place, that will limit formation of effective global roundabout supply chains, will reflect negatively on efficiency of the entire world economy, and especially on the economy of those regions whose participation in desirable specialization will be inhibited due to the shortage of intermediate goods and services.

Conclusion. Therefore, it is important to provide such a market pricing of transport services, which would allow transport companies and their customers to participate with no restrictions in development of effective roundabout supply chains in the global economy.

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