USC 656.2:658.152 *Doctor of science, professor V.G. Galaburda*

METHODS FOR DETERMINATION OF THE SYNERGISTIC EFFECT OF TRANSPORT

The problems of under-funding of innovative development of Russian railways, ways and methods of coverage of financial resources due to non-vehicle (synergistic) effect of the transport services within SPP. The formula of the definitions of the cost-benefit evaluation of investment for transport infrastructure projects. The methods of calculation of the individual elements synergies among consumers transport by accelerating the turnover of material resources and reduction ratios of their reserves, increasing income property owners in its implementation in the area of gravitational transport for social effect of increasing the mobility of the population with a substantial development of innovative transport.

Keywords: transport infrastructure, transport is, synergistic effect, the criterion of efficiency of investment, saving working capital, real estate prices, the social effect, co-financing of innovative projects, public-private partnership.

A rail transport is a very sensitive indicator of changes in the Russian economy, as well as vice versa, failures in the railways lead to disruptions in the businesses of all sectors and social tensions. Of course, that part of the reproaches railways valid and it is associated mainly with the ill-conceived decisions to reform the industry. However, I believe that the main problem is a lack of public support for the important and strategic industry in Russia - the main railways.

On the one hand the Government insisted on reform, and the other hand does not accompany this requirement serious economic support. Practically implemented a strategic program development of the railways until 2030. [1] The planned allocation of 450 billion rubles. only partially solves the problem of local transport links the Centre with the Volga region and the Far East . Over the last 20 years Russia has not built a single kilometer of new transit railways (except deadlocks at Yakutsk and Yamal mainly due to non-state resources). Fulfilling the great social commitment and working at state-regulated tariffs, the company JSC "Russian Railways"has an annual return of 1-2%. These resources are not even enough for a full maintenance, plant and equipment industry. This situation has never happened before. Even during the war we built the railways, and in peacetime introduced annually at least 600-800 km of new transport lines.

The main problem now - where to get money for the development of transport infrastructure? In our opinion one of the sources of supply could be so-called out transport (synergistic) effects. They are called the multiplier effect that receive economic actors after the implementation of innovative projects.

According to the encyclopedia - Synergy (from the Greek "sinergetikos" - agreed, acting) - scientific direction, studied the relationship between the elements of the whole system.

Scientists and economists have repeatedly argued that transport is a "locomotive" of the economy. Consumers of transport services receive significant benefits from the introduction of new transport links or reconstruction and development of existing lines not reflected in the total GDP. These synergistic effects associated with savings and working capital reserves enterprises derived from accelerating the delivery of goods, increase income property owners

and the development of new natural resources through the development of transport, obtaining social effect of improving transportation. As a rule, construction of new highways prices of real estate (land, flats, etc.) dramatically increased 4-5 times. According to our estimates the cumulative effect out transport consumers of transport services are 3-4 times higher than the effect of transport on the traffic growth [2].

The total cost of transportation projects can be determined according to the formula given the costs and benefits:

$$C_{pr.} = E_{tr.} + E_{n.}\,(K_{tr.} - \Delta E_{out.\,tr.}),$$

where $E_{tc.}$ *– currenttransportcosts;*
$E_{n.}$ *–coefficient of reduction of costs and effects (0.10);*
$K_{tr.}$ *- capitalinvestmentsinthedevelopmentoftransport;*
$\Delta E_{out.tr.}$ *–change of out transport effect.*

In this regard, believe that, in determining the needs of government investment in the development of transport must justify their project cost on the basis of the cost of comparable synergies designed to receive them in the same period as the capital cost inflation. This will speed up the implementation of investment projects in transport through co-financing through public- private partnership the transport services of capital expenditures for the development of transport infrastructure. This forms a market-based approach to the cost of transport services - to improve the quality of service the consumer pays.

Thus, the criterion of efficiency of investment in transport infrastructure can be considered a situation where a synergetic effect at least 2 times greater capital investments in the development of innovative transport, i.e.

$$\frac{E_{n.} * B_{out.tr.}(1 - \alpha_i)}{E_{n.} * K_t} \geq 2$$

where α_i *- inflation factor.*

The general formula for determining the synergistic effect of transport is [3]:

$$\Delta B_{out.tr.} = \Delta M_{cur.} + \Delta E_{acc.tur.} + \Delta E_{stock} + \Delta E_{loss} + \Delta P_{own} + \Delta E_{soc.} - \Delta D_{tr.}, rub.$$

Save current assets consignees of accelerating the delivery of goods ($\Delta M_{cur.}$) *is given by:*

$$\Delta M_{cur.} = \frac{\sum P_{ann.} * P_{car.}}{365} * (t_1 - t_2), thousand\ rubles,$$

where $\sum P_{ann.}$ *- annual transport specific cargo,thousand tons.*
$P_{car.}$ *-wholesale price of 1 ton of cargo carried, rub.;*
$(t_1 - t_2)$ *- reduction in terms of delivery after acceleration transport day.*

Cost savings from enterprises to accelerate the turnover of capital and natural resources($\Delta E_{acc.tur.}$)*determined by the formula:*

$$\Delta E_{loss.} = \sum C_e * (d_1 - d_2), thousand\ rubles,$$

where $\sum C_e$ *- the amount of curret assets of enterprises,thousand rubles,*

($d_1 - d_2$) - faster turnover of working capital before and after the improvement of transport service, day.

Save the cost of the stock values by reducing the delivery time, and the regularity of mass transport (ΔE_{stock}) is given by:

$$\Delta E_{stock} = N_{day} * P_{mat.\ ass.} * (q_1 - q_2), \text{thousand rubles,}$$

whereN_{day}- the norm of daily stock material assets, thousand units;

$P_{mat.ass.}$- unit price of material assets in reserve, rubles,

($q_1 - q_2$) - shortening delivery day.

Cost savings by reducing the loss of goods and the use of specialized rolling stock, containers and package deliveries (ΔE_{loss}) is given by:

$$\Delta E_{loss} = \sum \mathbf{T_{car.}} * P_{car.} * (\alpha'_n - a''_n), \text{ thousand rubles;}$$

where$\sum T$ - volume of cargo, thousands of tons;

$P_{car.}$- price of 1 ton of cargo, ruble;

($\alpha'_n - a''_n$) - reduction in the share of losses of goods before and after the mechanization of loading and unloading.

Increase income property owners in the development of transport infrastructure ($\Delta I_{own.}$) is given by:

$$\Delta I_{own.} = \sum \mathbf{Z_{own.}} * (R_2 - R_1), \text{thousand rubles;}$$

where $\sum Z_{own.}$- volume of real estate (land and buildings) in real terms to expedite the delivery of goods and improving

transport infrastructure, m^2.

($R_2 - R_1$) - the rising cost of real estate units after the development of transport infrastructure in the region, rub./m^2.

Social effect from improved public transport services ($\Delta E_{soc.}$) is given by:

$$\Delta E_{soc.} = (\sum \mathbf{S_2} - \sum \mathbf{S_1}) * \Delta K_{mq}$$

where $\sum S_1$, $\sum S_2$ - incomes associated with improving transport services before and after the improvement,

respectively, thousand rubles;

ΔC_{mq} - change correction coefficient that takes into account the increased mobility of the population by improving the quality of transport services.

Damage from transport associated with environmental pollution, violation of traffic safety, etc. ($\Delta D_{tr.}$) is given by:

$$\Delta D_{tr.} = \beta_{loss} * C_{loss}, rubles,$$

whereB_{loss}- regulatory standards or actual pollution and other indicators of damage from transport;

C_{loss} - average cost per unit of installed performance losses rub.

Since implementation of the time difference in capital costs and obtain synergies transport must take into account the projected level of inflation and changes in resource prices in the long term(α_u).This means that if a particular development project transport line is designed for 10 years, and the value of the vehicle is predicted effect for the same period.

It should be very carefully predict the potential volume of traffic flows. So obviously that Transsiberian already paid for itself many times, and BAM single track with weak infrastructure, probably pay for itself soon, if not to its modernization and begin to actively explore the natural resources of the region of gravity line. At the same time accelerated the completion of construction of Yakutsk railway will pay off very quickly by switching to it, the so-called "northern delivery" and produce a significant synergistic (the multiplicative) effect of lowering standards stocks of material resources, accelerate the development of the regional economy, and other factors.

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