Formation of an Integrated Financial Regulation System of Transport Corporations' Economic Development

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Abstract:

Scientific findings of this article correspond with the fact that the development of interacting business entities is quite diverse. This affects the efficiency of corporations' budget management. So, a need arises to adjust the financial assets applied to the development of integrated enterprises, basing on their economic compatibility evaluation.

Authors suggest using the companies' development intensity determined by the increasing qualitative business activity indicators compared to the increasing quantitative ones.

Theoretical economics gives no clear definition of compatibility of developing companies. Economic practices do not pay proper attention to the development of effective financial regulation of economic development of companies integrated into a corporation.

The article suggests original definitions of economic compatibility as well as the model of forming the integrated system of transport companies' economic development on the basis of morphological approach. Theoretical and methodological findings are approved in the business activity of transport corporations

Keywords: Integration, economical compatibility, intensification, morphological approach.

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1. Introduction

Actually, budgets at the level of finance management of Russian transport companies appear as the comprehensive system of loans and emoluments intended to various targets and applied according to specific criteria. One could recognize the examples of cross and matching funding. Many programs are underfunded, modified, permanent funding is not provided. The different level of development of the transport process' elements leads to poor tax revenues, meanwhile the financial aid could be provided even in failed business scenario (to say, an aid was provided to VIM-avia to complete transportation in recreational routes). Integration processes in the field of transportation are continuous. They cover different types of transport and company's activities: inner processes; processes of river transportation and the ones in railway in mixed rail and water transportation; ones in rail and road transport in passenger transportation, etc. Integration contributed to the development of large companies of all types of transport. Examples include OAO RZD (JSC Russian Railways) uniting 16 branches of Russian Railways, MSCO (Murmansk Shipping Company), ANSKC (Northern Shipping Company) and others, SCF Group (PJSC Northern Commercial Marine), Aeroflot (Aeroflot-Russian Airlines), UTair (UTair), S7 Airlines (Siberia) and other air carriers. Large transport companies are protecting their interests in associations like CNPC (Union 'National Chamber of Shipping'), international organizations BIMCO.INTERTAKO and others. Aviation creates strategic alliances of airlines to coordinate business processes, for example, on the basis of joint operation of overhead lines and redistribution of companies on the basis of routes' capacity.

A new aspect of transport integration has emerged along with the formation of the CIS (Commonwealth of Independent States) and Russia's participation in international transport organizations: the UNECE ITC (Inland Transport Committee of the United Nations Economic Commission for Europe), the International Transport Forum, the UIC (International Union of Railways) , The Council for Rail Transport of the Commonwealth Member States, OTLC (United Transport and Logistics Company) with the participation of Russia, Belarus, Kazakhstan. Notable that along with the integration, the processes of the disintegration of enterprises, companies and associations on a temporal and spatial scale are taking place. So, Aeroflot broke up into 467 operators during the perestroika. And this followed by the integration processes later. As a result of structural reform and disintegration, the operator companies emerged on the railway transport, forming the organizational basis for the integrated transport services market (Vovchenko *et al.,* 2017; Albekov *et al.,* 2017; Anikina *et al.,* 2016).

Russia performs one of the largest domestic and international freight and goods exchange. The leading role in Russia's transport system belongs to railway companies. In foreign trade, the share of railways amounts for about half of export-import operations. The process of effective transport corporations' activity is accompanied by balance problems arising in the context of differences in the

formulation and implementation of the development goals. As a result, budgetary regulation of enterprises and organizations within the companies becomes inefficient. To say, in railways, the increase in the speed of train traffic is connected with additional fuel and energy costs, maintenance of infrastructure facilities and locomotive productivity and strengthening of facilities. At the same time, planned increasing speed and implemented according to the plan leads to a re-maintenance of the locomotive fleet and accordingly, to additional spendings and financial losses. The need to adjust the amount of financial resources allocated to the development of integrated enterprises is obvious. Transport infrastructure needs stable funding. It is possible when developing an appropriate strategy based on evaluating the efficiency of company's development. Russian legislation peculiarities are about to limit the turnover of railway transport assets, raising credit resources, and the return on investments for private investors. On this basis, a number of problems also arise: private investments could be directed to routes that amounts for only 15% of traffic, which limits the efficiency of investments in the renewal of the fleet of locomotives.

Funding of unprofitable suburban transportations is limited as the regions with insufficient funds are repaid for losses. The depreciation charges and profits targeted to fund the mainlines are not sufficient. A cross-subsidy between freight and passenger traffic is taking place, being embedded in the tariff setting system. The existing problems ultimately increase the transport load on the consumer and worsen the financial stability of the enterprises, leading to a decrease in tax revenues. The solution of problems in our opinion is to build an integrated system of financial regulation by the development of corporations, based on the criteria for evaluating the economic compatibility, redistribution of financial resources and balanced development of their enterprises.

2. Material and methods

Methodological basis of the study on integration problems of transport companies is built upon the works of domestic and foreign scientists, as well as developments on financial and economic issues of integration, studies of financial and economic activities of railway transport. Crucial provisions are developed on the basis of official data of Russian Railways and the Federal State Statistics Service of Russia (Rosstat). In the course of the study, legislative acts, decrees, and subordinate documents connected with railway transport were used. To resolve integration problems, authors utilized morphological, factorial approaches as well as logical and economic-mathematical modeling.

3. Discussion

Scientists and practitioners tried to solve the problems of economic activity, in particular the increase in the speed of trains, basing on the logistics concept, the concepts of optimizing the speed of train traffic within the framework of landfill technologies, the readiness of fleet, highlighting certain issues of interaction. The

complex solution of problems of interaction could be based on the authors' opinion on the concept of integration development, and the intensive development of enterprises and companies is the criterion for evaluating joint activities. The analysis revealed the key quality indicator to compare enterprises in terms of intensive development. It is the profitability of assets, as well as revenue per ruble of fixed production assets for Russian Railways. At the same time, intensive development is driven by a predominant increase in these indicators. As a result of calculations, the coefficient of intensive development is determined, and the reserves of intensification are determined in the course of factor analysis.

Studying the theory of integration leads to the need to determine the compatibility of elements in the system. Current definitions of compatibility are associated with hardware, software, information, social-psychological, situational, anthropometric, target, electromagnetic, environmental and other compatibility. Analyzing the approaches above, it is possible to propose the following definitions: "Compatibility is a feature of elements of the system to effectively perform their functions under the given conditions without external interference"; "Compatibility is a feature of an economic system elements and the system as a whole in accordance with their functional status and attitude to the backbone element (a person or a group of people) to effectively perform their functions in certain conditions, mainly with no external interference." Thus, compatibility is a certain quality that determines the system and the property of integrating a key concept in evolution. Violations in the process of operation of the control object are caused by a violation of the compatibility of elements affecting the deviation of systems from critical values. These deviations should be adjusted to ensure the appropriate quality of the system.

4. Results

Regulation of the compatibility of integrated structures is performed on the basis of a system of interests' harmonization and is characterized by certain indicators. Authors suggests using the morphological matrix of indicators as a methodological basis for determining the compatibility of elements of economic entities, where the interrelations of integrated structures are reflected by a complex of qualitative indicators of economic entities, and therefore, not only the degree of intensification could be assessed, but also its factor analysis, meeting the purpose of the research. The technique consists of the following stages: ranking of subjects of the transport process; morphological formation of quantitative and qualitative indicators; establishment of standards for intensification; working out of development options taking into account new technologies; regulation of interaction.

The first stage includes the arranging of business entities on the basis of the annual transport services' revenue or another criterion determined by long-term or short-term goals. This is a fundamental point in the technique, because changing the order of representation of the integration process' subjects determines the system of factors, and hence the methods of management.

At the second stage, authors suggest forming an angle body matrix of interrelation of indicators to obtain enterprise compatibility indicators. The rules for constructing matrices suggest that the angular element of the matrix is the resulting one, and the diagonal elements are the factor ones. The matrix is constructed on the principle of pairwise comparison, and hence its angled segment includes relative (qualitative) indicators. They characterize the intensity of development of enterprises, and its level will characterize the efficiency of integration and its limits. Dynamics of quantitative indicators in the analytical model is compared with the dynamics of qualitative indicators. The growth rates of qualitative indicators (development intensity) should be higher than the growth rates of quantitative ones (extensiveness of development). After determining the increase in the qualitative indicator and its factor system, it is possible to manage the efficiency of integration processes, attracting internal and external resources: increasing labor productivity, capital productivity, material return, and justify the investment and the cost limit in the amounts necessary for the functioning and development of the enterprise. Thus, the system of factors of production will be represented as a set of factors and subfactors. The financial and economic architecture of integrated enterprises represents a morphological matrix where enterprises are distributed in order of decreasing effect, or in a different order, depending on integration goals (Figure 1).

Figure 1. *Models of integrated enterprises' cluster*

Group	A																	
Enterprise 1	A_1	a^{11}_8	a^{11}_7	a^{11}_6	a^{11}_5	a^{11}_4	a^{11}_3	a^{11}_2	a^{11}_1	a^1_{10}	a_{19}	a_{18}	a_{17}	a_{16}	a_{15}	a_{14}	a_{13}	a_{12}
	A_2	a^{21}_8	a^{21}_7	a^{21}_6	a^{21}_5	a^{21}_4	a^{21}_3	a^{21}_2	a^{21}_1	a^2_{10}	a_{29}	a_{28}	a_{27}	a_{26}	a_{25}	a_{24}	a_{23}	
	A_3	a^{31}_8	a^{31}_7	a^{31}_6	a^{31}_5	a^{31}_4	a^{31}_3	a^{31}_2	a^{31}_1	a^3_{10}	a_{39}	a_{38}	a_{37}	a_{36}	a_{35}	a_{34}		
Enterprise 2	A_4	a^{41}_8	a^{41}_7	a^{41}_6	a^{41}_5	a^{41}_4	a^{41}_3	a^{41}_2	a^{41}_1	a^4_{10}	a_{49}	a_{48}	a_{47}	a_{46}	a_{45}			
	A_5	a^{51}_8	a^{51}_7	a^{51}_6	a^{51}_5	a^{51}_4	a^{51}_3	a^{51}_2	a^{51}_1	a^5_{10}	a_{59}	a_{58}	a_{57}	a_{56}				
	A_6	a^{61}_8	a^{61}_7	a^{61}_6	a^{61}_5	a^{61}_4	a^{61}_3	a^{61}_2	a^{61}_1	a^6_{10}	a_{69}	a_{68}	a_{67}					
…	A_7	a^{71}_8	a^{71}_7	a^{71}_6	a^{71}_5	a^{71}_4	a^{71}_3	a^{71}_2	a^{71}_1	a^7_{10}	a_{79}	a_{78}						
	A_8	a^{81}_8	a^{81}_7	a^{81}_6	a^{81}_5	a^{81}_4	a^{81}_3	a^{81}_2	a^{81}_1	a^8_{10}	a_{89}							
	A_9	a^{91}_8	a^{91}_7	a^{91}_6	a^{91}_5	a^{91}_4	a^{91}_3	a^{91}_2	a^{91}_1	a^9_{10}								
…	A_{10}	a^{10}_{18}	a^{10}_{17}	a^{10}_{16}	a^{10}_{15}	a^{10}_{14}	a^{10}_{13}	a^{10}_{12}	a^{10}_{11}									
	A_{11}	a^{11}_{18}	a^{11}_{17}	a^{11}_{16}	a^{11}_{15}	a^{11}_{14}	a^{11}_{13}	a^{11}_{12}										
	A_{12}	a^{12}_{18}	a^{12}_{17}	a^{12}_{16}	a^{12}_{15}	a^{12}_{14}	a^{12}_{13}											
…	A_{13}	a^{13}_{18}	a^{13}_{17}	a^{13}_{16}	a^{13}_{15}	a^{13}_{14}												

A_{14}	a^{14}_{18}	a^{14}_{17}	a^{14}_{16}	a^{14}_{15}
A_{15}	a^{15}_{18}	a^{15}_{17}	a^{15}_{16}	
A_{16}	a^{16}_{18}	a^{16}_{17}		
A_{17}	a^{17}_{18}			
A_{18}				

(Enterprise n)

If $A_0^n = \{a_{0ij}\}$, $i = 1...17$, $j = 2...18$, $n = 1...18$, then, in accordance with angle body matrix, A_0^1 is for revenues, A_0^2 - costs, A_0^3 - base year capital of the enterprise 1; A_0^4 - revenues, A_0^5 - costs, A_0^6 - capital of the enterprise 2 etc.

Qualitative indicators: $a_0^{1,2} = \dfrac{A_0^1}{A_0^2}$ - revenue per 1 ruble of costs, $a_0^{1,3} = \dfrac{A_0^1}{A_0^3}$ - capital turnover ratio, $a_0^{1,4} = \dfrac{A_0^1}{A_0^4}$ - revenue ratio, the ratio of enterprises' interconnection for the base year. Thus, the indicators above are built as a result of dividing of columns' parameters by the corresponding parameters of rows. The result has the economic sense characterized by quantitative financial indicators.

The third stage involves determining the degree of compatibility of economic entities in accordance with the methodology of the consolidated analysis of the intensification indicators. At the same time, the dynamics of quantitative indicators A_0^i, A_1^i and qualitative indicators of the use of resources and indicators of the interrelations of subjects $(\dfrac{a_1^{ij}}{a_0^{ij}})$ is determined. Further, the ratio of the increase in the qualitative index to the percentage of the increase in the quantitative net result is determined. To measure the impact of individual factors on the growth of the resulting indicator, authors utilize the correction method (index method) with the calculation of the corresponding indices. The analytical formula is as follows: $A_n = A_j * a^{ij}$, where n = 1,2 ... 18, $i = 1, 2...17$; $j = 2, 3...18$. At the same time, the influence of the quantitative factor (A_j) is determined by the ratio of the growth rate of the resource to the growth rate of the resulting indicator multiplied by 100%. The influence of the qualitative indicator (a^{ij}) is determined by the subtraction of the obtained value of the influence of the quantitative factor from 100%:

$$\Delta A_n(A_j) = \frac{J_{A_i} - 1}{J_{Aj} - 1} * 100\%$$

$$\Delta A(a_{ij}) = 100\% - \Delta A_n(A_j)$$

where J_{A_i} - growth rate of A_i;

J_{A_j} - growth rate of A_j.

The fourth stage involves determining the compatibility standards for the upcoming development period in accordance with the possibility of intensive development.

At the fifth stage, the cluster's development of normative and targeted management is carried out by developing measures and making decisions to improve the compatibility of enterprises by increasing the efficiency of activities by attracting internal and external resources and other actions. In this case, the algorithm for calculating the attracted external resources is as follows:

1) Determining the required extensiveness:

$$K_{e.d.} = \frac{J_{A_{i1}} - 1}{J_{A_{iH}} - 1} * 100\% \quad,$$

where $K_{e.d.}$ - extensiveness decrease ratio;

J_{A_i} - growth rate for A_i;

2) Determining the growth rate for revenues:

$K_{r.g.} = 1 + K_{e.d.}$,

where $K_{r.g.}$ - revenues growth ratio;

3) Determining the total revenues for intensive development:

$A_{j0} * K_{r.g.} = A_{jtr}$,

where A_{j0} - basic revenues value;

A_{jtr} - total revenues value;

4) Raising extra revenue using inner economic reserves:

$A'_{j1} - A_{j1} = A_{jinn}$

where A'_{j1} - revenues after taking measures;

A_{j1} - revenues before taking measures;

5) Determining the external revenues needed:

$A_{jt} - A_{j1} = A_{jext}$

where A_{jext} - external revenues needed for intensive development;

6) Total revenues needed:

$$A_{j\,\text{int}} + A_{jext} = A_{jnd} \; ;$$

7) Total revenues:

$$A_{jt} = A_{jnd} + A_1^{13} \; .$$

Authors adopted the following compatibility requirements for the quantitative assessment: the impact of the quantitative cost factor on the revenue growth should be at maximum of 49%, the impact of the quality factor on the revenue growth should be at least of 51%. If the reporting on certain indicators is missing, the corresponding rows and columns of the matrix should be deleted and subsequent calculations are to be corrected. A comprehensive evaluation of enterprises' compatibility could be carried out by reducing the qualitative indicators of intensification into a single one. The profitability of assets could be considered as a general indicator of enterprise compatibility, and the compatibility index acts a tool to increase it.

Thus, the reserves of economic activity could be determined to improve the compatibility of enterprises, the grounds for the transition to new forms of ownership and investment. Therefore, determining the internal and external factors affecting the financial and economic compatibility of enterprises is important. One could determine the amount of income needed for intensive development of the enterprise, increase revenue or save costs through internal organizational and economic activities, the financial activity needed to attract investment.

The proposed approach made possible determining the structural reserves of enterprises located at the North-Siberian railway domain in terms of the correct financing of the enterprises of the Directorate for the Repair of Railway Fleet and the Directorate of High-Speed Communication of the North-Caucasian Railways, a branch of Russian Railways, to increase the speed of trains. At the normative level of compatibility + 96%, the level of intensive development in the Directorate for Repair of Railway Fleet is 187%, as for the Directorate of High-speed Communication, the level is + 94.2%. The calculation of the amount of social service commissioning for the development of enterprises of the Directorate of Social Sphere has been carried out, the increase in the cost limit for the development of recreation centers and raising of external resources have been determined as well.

The deficiency in proceeds for the development of recreation centers amounted 18042 thousand rubles. The limit for spending for recreation centers is below the required level by 5983 thousand rubles. The compatibility levels of the railway station, seaport and sea carrier have been determined in the foreign economic activity. The profitability of rail transportation through seaports appears less than the profitability of domestic transportation by 20%. Considering that the share of export shipments through the Southern ports is about 34%, the increase in the efficiency of transportation becomes an urgent task solved by the cooperating transport

enterprises: railway station-sea port-sea carrier. These calculations based on the proposed methodology on the data of the Novorossiysk transport hub, indicated that the development of the station and the seaport is predominantly intensive, although the intensity level of development is different and requires appropriate financial regulation. Performance management here is the task to form an integrated system of financial regulation, based on 'soft' forms of interaction of enterprises.

5. Conclusion

Integration in transport companies involves mainly qualitative changes determining its forthcoming development, and compatibility is a qualitative characteristic reflecting the feature of an element of the system, measured by its relation to the system-forming elements. The essence of compatibility is the feature of the economic system's element and the system as a whole, in accordance with its functional status, to effectively perform its functions under given conditions with no external interference. Compatibility of system elements is clearly expressed in conditions of vertically integrated production. Compatibility between different elements of the system is characterized by the degree of intensity of the shared resources.

The management of transport production includes a set of actions supporting the compatibility of the elements of the system, aimed at its efficient and qualitative functioning. At present, Russian Railways is facing the problem of integrity of its transformations and the problem of evaluation of compatibility as a criterion for the economic integration of the holding's elements. Authors consider that it is necessary to rank the enterprises of Russian Railways in terms of their compatibility and to develop options for their economic integration. Integration of transport system's elements is aimed at improving the performance of transport, resource management, combining intensive and extensive growth. The result is an increase in the profitability of transport companies, an increase in the competitiveness of railway transport, an increase in the reliability of information, a reduction in total costs as well. The results of the analysis showed that the goal of economic compatibility of regional railway directorates is not achieved. The existing mechanism for the formation of regional entities' activity indicators is losing effectiveness, since they are oriented more toward the activity of a particular enterprise, rather than a corporate association. As a result, the feedback of individual integrated units is lost, which is determined by their compatibility. Therefore, new methodology to improve the compatibility of integrated enterprises is needed. The system of production factors is represented by a multitude of factors and subfactors. However, the interrelations of factors are not fully investigated, and, therefore, the compatibility of the company's divisions could not be determined fairly correctly.

Therefore, the morphological approach in the methodological framework of determining the compatibility of economic system's indicators and elements is most

acceptable. Malfunction of the object is associated with incompatibility of the components. This leads to deviations in the development of the enterprise and requires adjustments based on information on the level of intensification. Corrective actions in transport interaction are focused on data on the intensive development level and the impact of deviations on the intensity of the company's operation characterized by the intensity of resource utilization. Nevertheless, the key objective is the safety and quality of transport services for consumers in conditions of technological, financial and economic and other limitations.

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