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## **INNOVATIVE APPROACHES TO THE ORGANIZATION OF BUSINESS PROCESSES OF TRANSPORT ENTERPRISES IN THE CONTEX OF THE EUROPEAN INTEGRATION**

The simultaneous development of the European integration processes and military actions in Ukraine require the justification of innovative approaches to the organization of business processes of transport companies to ensure their competitiveness in difficult conditions. The article substantiates directions and methods of innovative reorganization of business processes of a transport enterprise, taking into account external factors and regional characteristics.

The article uses the methods of regression modeling to determine the degree of influence of environmental factors on the activities of enterprises, as well as the methodology of the European Cluster Observatory regarding the feasibility of creating clusters.

It was established that the most influential factors of the external environment are the industrial production index (1.818) and the innovation index (0.639). To ensure the effective functioning of transport enterprises under the influence of these external factors, the feasibility of reorganizing their business processes by forming clusters with a logistics outsourcing platform is proposed and substantiated. The article carried out a quantitative assessment of the regions of Ukraine and established that it is most expedient to form transport and logistics clusters in Dnipropetrovsk (specialization index – 1.131), Odesa (specialization index – 1.244) regions and the city of Kyiv (specialization index – 1.810). The article highlights the joint business processes of transport enterprises, on the basis of which it is most effective to design a logistics platform as an integrated system of interaction of participants in the logistics chain according to B2B, B2C, B2G schemes. Common business processes include such groups as informational, economic, technological, financial, marketing, intellectual, managerial, and

innovative. The structural components of the logistics and outsourcing platform are presented. They are logistics and outsourcing companies, information and analytical centers and functional services. The organizational and management mechanism of joint business processes of transport enterprises for the logistics platform has been developed.

**Key words:** *business processes, logistics platform, transport, logistics, cluster, European integration.*

Одночасний розвиток євроінтеграційних процесів та військових дій в Україні вимагають обґрунтування інноваційних підходів до організації бізнес-процесів транспортних компаній для забезпечення їх конкурентоспроможності в складних умовах. У статті обґрунтовано напрями та методи інноваційної реорганізації бізнес-процесів транспортного підприємства з урахуванням зовнішніх факторів та регіональних особливостей. Авторами використано методи регресійного моделювання для визначення ступеня впливу факторів зовнішнього середовища на діяльність підприємств, а також методологію Європейської кластерної обсерваторії щодо доцільності створення кластерів. Встановлено, що найвпливовішими факторами зовнішнього середовища є індекс промислового виробництва (1,818) та індекс інновацій (0,639). Для забезпечення ефективного функціонування транспортних підприємств в умовах дії цих зовнішніх факторів запропоновано та обґрунтовано доцільність реорганізації їх бізнес-процесів шляхом формування кластерів з платформою логістичного аутсорсингу. У статті проведено кількісну оцінку регіонів України та встановлено, що транспортно-логістичні кластери найбільш доцільно формувати в Дніпропетровській (індекс спеціалізації – 1,131), Одеській (індекс спеціалізації – 1,244) областях та Києві (індекс спеціалізації – 1,810). Авторами виділено спільні бізнес-процеси транспортних підприємств, на основі яких найбільш ефективно проектувати логістичну платформу як інтегровану систему взаємодії учасників логістичного ланцюга за схемами B2B, B2C, B2G. Загальні бізнес-процеси включають такі групи, як інформаційні, економічні, технологічні, фінансові, маркетингові, інтелектуальні, управлінські та інноваційні процеси. Представлено структурні складові логістично-аутсорсингової платформи: логістичні та аутсорсингові компанії, інформаційно-аналітичні центри та функціональні служби. Розроблено організаційно-управлінський механізм спільних бізнес-процесів транспортних підприємств для логістичної платформи.

**Ключові слова:** *бізнес-процеси, логістична платформа, транспорт, логістика, кластер, євроінтеграція.*

## Introduction

In the modern conditions of the simultaneous development of European integration processes and military actions in Ukraine, transport enterprises of Ukraine especially need the implementation of innovative organizational approaches that act as the driving force behind their development and ensuring competitive advantages. During the war cooperation between Ukraine and the EU aims to increase the mobility of transport flows, eliminate technical and administrative barriers related to border crossing, improve transport networks, modernize transport infrastructure facilities and develop digital infrastructure. All this requires investment in R&D. Thus, in the Europe-2020 Strategy, the volume of investment in innovation was projected at 3% of EU GDP.

During the war, the requirements for transport companies have increased significantly: on the one hand, they must be competitive, productive and provide safe transport services with a certain level of profitability, and on the other hand, resist constant changes in economic, environmental, socio-political, epidemiological factors.

The problems of modern management of transport enterprises determine the objective necessity of implementing and supporting innovative business processes capable of generating synergy due to the mobilization of the internal potential of both individual transport enterprises and their cooperative networks. One of the ways to solve this problem is the integration of transport, logistics companies, customs authorities, freight forwarders, cargo owners

and other participants in the logistics chain of cargo delivery in the form of logistics and outsourcing platforms based on clusters.

### **Literature review**

Problems of development of innovative approaches to the organization of transport and logistics enterprises are investigated in many scientific studies by domestic and foreign scientists. Researchers focus on the application of process management to optimize business processes in terms of their standardization [1] and study the impact of a set of external and internal factors on the activities of transport companies, which are grouped according to the classification criteria, which are also considered separately [2; 3]. Special attention in modern research by domestic scientists is paid to the adaptation of transport systems of Ukraine and the European Union in terms of opportunities and barriers to the implementation of unified standards and rules of functioning of transport, development of transport infrastructure of Ukraine and its integration into the pan-European transport system [4; 5; 6].

The issues of transformation of existing business models under the influence of the implementation of innovative technologies have been actively studied by various scientists [7; 8; 9]. In particular, the work of J. Fellenstein, A. Umaganthan [10] is devoted to the study of dynamic opportunities for innovation of business models in the direction of digital transformation. Problems of implementing innovative solutions in global supply chains, the role of information technologies in transport industry, mechanisms for acquiring and transferring knowledge between supply chain partners, as well as knowledge management paradigms are studied by Dwivedi A. [11]. Wagner S.M. in his studies [12], offered a conceptual framework for managing innovation in a logistics service provider from the point of view of both the sectoral and firm levels. The works of Gemici E. & Alpkan L. [13] identified the factors of implementation of breakthrough innovations by the current operator on the example of Turkish airlines and assessed the possible consequences

of their destructive forces and the speed of response of the industry leader company to this type of innovation.

The development of theoretical and practical issues related to the functioning of transport and logistics clusters concerns possible models of transport and logistics clusters [18], cluster mechanisms of interaction of economic entities, cluster synergy formation, identification of key success factors of transport and logistics clusters, etc. [14; 15; 16; 17].

A separate area of research of transport and logistics clusters is the design of a fundamentally new approach to their development as an effective form of supply chain management, including their global varieties. Ukrainian and foreign scientists have identified the place of cluster infrastructure in the supply chain management of transport and logistics clusters of innovative type and developed approaches to the formation of perfect supply chains, as well as to the study of the likelihood of “value added” in cluster structures [18; 19; 20; 21].

There have been numerous studies to investigate the influence of cluster integration on supply chain flexibility and its development [22]. In-depth studies of the benefits of logistics clusters have been conducted by Liliana Rivera, David Gligor, and Yossi Sheffi [23]. The authors have proved that the agglomeration of logistics firms provides key benefits such as the benefits of cooperating with companies, offering value-added services, career mobility for employees, and job growth. Also they have proposed a broad description of these benefits and the mechanisms that contribute to their implementation [24].

### **Selection of previously unsolved parts of the overall problem**

It should be noted that despite the existence of significant amount of the theoretical and practical research about innovative development of transport and logistics enterprises, there is still a need for further in-depth study, in particular from the standpoint of transport and logistics platforms based on transport and logistics clusters. Innovative technologies cause constant

changes in the business environment, which necessitates constant monitoring of influencing factors and the development of network approaches to the organization of business processes in transport and logistics.

**The purpose of the article**

The purpose of the paper is to substantiate the practical approaches and methods of innovative reorganization of the business processes of the transport enterprise, taking into account the factors of the external environment and regional conditions of transport development.

The study presented in this paper consists of the following stages:

1) assessment of the impact of external factors on the activities of transport enterprises of Ukraine in the context of European economic integration;

2) assessment of the regions of Ukraine in terms of the economic prerequisites for the formation of transport and logistics clusters;

3) formation of practical proposals for the creation of a transport and logistics cluster based on logistics and outsourcing platform.

**The main research results**

It is advisable to reorganize an enterprise’s business processes taking into account the influence of the most important environmental factors. For this purpose, the study used a linear regression model of the following type:

$$Y = a_0 + a_1x_1 + \dots + a_nx_n + \varepsilon, \quad (1)$$

where Y is the resulting indicator;

$a_0, a_1, \dots, a_n$  - regression coefficients;

$x_1, \dots, x_n$  - independent variables (factors influencing the resulting indicator);

$n$  - the number of factors being studied;

$\varepsilon$  - the random error of the regression equation.

The least squares method (LSM) was used to estimate the linear regression parameters. It allowed to obtain such estimates of parameters in which the sum of squares of deviations of the actual values of the resulting indicator from the theoretically calculated values was minimal, i.e.

$$\varepsilon = \sum_{i=1}^n (Y - \hat{Y})^2 \rightarrow \min, \quad (2)$$

where  $n$  is a number of levels of dynamics series;

$Y$  – actual values of the resulting indicator;

$\hat{Y}$  – theoretical (calculated) values of the resulting indicator.

To find the values of unknown parameters  $a_0, a_1, \dots, a_n$  time derivatives were equated  $\frac{\partial \varepsilon}{\partial a_i}$  according to the given parameters to zero:

$$\frac{\partial \varepsilon}{\partial a_0} = 0, \frac{\partial \varepsilon}{\partial a_1} = 0, \dots, \frac{\partial \varepsilon}{\partial a_n} = 0 \quad (3)$$

This made it possible to obtain a system of the following normal equations

$$\begin{cases} Y = a_0 \cdot n + a_1 \sum x_1 + a_2 \sum x_2 + \dots + a_n \sum x_n, \\ \sum Y \cdot x_1 = a_0 \cdot \sum x_1 + a_1 \sum x_1^2 + a_2 \sum x_1 x_2 + \dots + a_n \sum x_1 x_n, \\ \dots \\ \sum Y \cdot x_n = a_0 \cdot \sum x_n + a_1 \sum x_1 x_n + a_2 \sum x_2 x_n + \dots + a_n \sum x_n^2. \end{cases} \quad (4)$$

At the second stage of the study, based on the methodology of the European Cluster Observatory, the regions of Ukraine were assessed according to three indicators: “size”, “specialization” and “focus” of the cluster.

The “size” of a cluster is defined as the region’s share of the total number of people employed in the country’s cluster group:

$$Size = \frac{Emp_{ig}}{Emp_i} \quad (5)$$

$Emp_{ig}$  - a number of employees in the industry  $i$  in the region  $g$ ;

$Emp_i$  - a number of people employed in the industry  $i$  of the country;

The significance in term of “size” occurs when the region falls in 10% of the region’s leading in this indicator. Specialization is estimated by the coefficient of localization:

$$LQ = \frac{\frac{Emp_{ig}}{Emp_g}}{\frac{Emp_i}{Emp}} \quad (6)$$

$Emp_g$  - total number of employees in the region  $g$ ;

$Emp_p$  - total number of employees in the country.

The first group includes industries in which the localization coefficient is 1.25-1.3 and above, which indicates the presence of

specialization in the region. When the localization coefficient  $\geq 2$  - this means a high level of specialization.

The second group includes industries in which potential clusters can be created, as these may be new growing industries that can later become leading industries in the cluster. The value of the localization coefficient in this group does not exceed 1.25, and the share of employees is less than 0.4.

The third group of industries with a localization coefficient of about 0.8 includes industries that do not have high potential in a regional development, but provide infrastructure or support the functions of leading industries.

The "focus" indicator is calculated based on the share of the cluster in the total number of employed in the region:

$$Focus = \frac{Emp_{ig}}{Emp_g} \quad (7)$$

The focus indicator is considered significant if it is included in 10% of clusters of the same category, which account for the largest share of total employment in a given region.

To determine the development of regional clusters, it is proposed to take the value of the focus coefficient of 0.4.

The impact of the external environment, which is characterized by diversity and the degree of influence of a significant number of factors on the activity of enterprises, necessitates their study and evaluation, in order to minimize the negative impact on entrepreneurial activity. The main difficulties in the analysis of the influence of external factors on the activity of enterprises are a significant degree of uncertainty, the growing dynamics of changing market requirements, and interdependence and interaction between factors which requires the use of modern advanced methods of analysis.

To build a regression model, many environmental factors affecting the change in the efficiency of functioning of transport enterprises were identified. As a result of the study of the external factors influencing the activities of transport enterprises, the authors systematized them into five groups (Fig. 1). The components of these groups make it possible to quantify their impact (positive or negative) on the activity of the enterprise.

It should be noted that the activity of transport enterprises largely depends on the stable and efficient production activity of industrial enterprises in general. Change in the production volumes of related industries directly affects the volumes of traffic by transport companies, increasing or decreasing them. Therefore, the group of external factors of production is represented by the index of industrial products (Fig. 2). As can be seen from the figure, the index of industrial production during the study period ranged from -1.8 to + 12.8%.

To characterize the degree of infrastructure development, it is advisable to use the parameter "quality of trade and transport infrastructure", which is included in the Logistics Performance Index (LPI-Logistic Performance Index), which characterizes the ease of transportation and logistics at both national and international levels (Table 1). The expediency of using this sub-index as an external factor of the second group of infrastructural factors is justified by the difficulty of summarizing the performance of different modes of transport in one indicator. Among the 160 countries for which the logistics efficiency index has been compiled, Germany is the leader in the analyzed period. Ukraine's place in this ranking is quite unstable, characterized by leaps from the 61<sup>st</sup> place in 2014 to the 80<sup>th</sup> place in 2016, and, finally, to the 66<sup>th</sup> place in 2018. As for the infrastructure sub-item, this value decreased with each passing year and was only a half of the leader's country.

In this study, the group of external social factors is represented by the average number of full-time employees in transport, as the number and scale of staff turnover at transport enterprises determine production volumes of the transport industry and the quality of provision of transport services. On the other hand, this indicator allows for the comparison of the number of employees and supply of labor resources by transport enterprises with the total number of people employed in the economy. The results of the analysis of this indicator are given in table 2.

The group of external economic factors is represented by the inflation index, which characterizes the dynamics of general level of prices for goods and services purchased by population for non-productive consumption (Fig. 3).

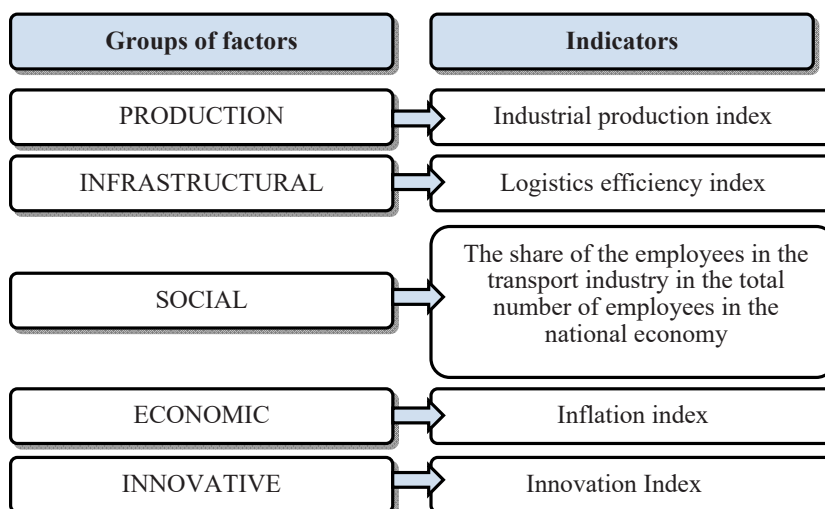


Fig. 1. External factors influencing the activity of transport enterprises and indicators of their measurement

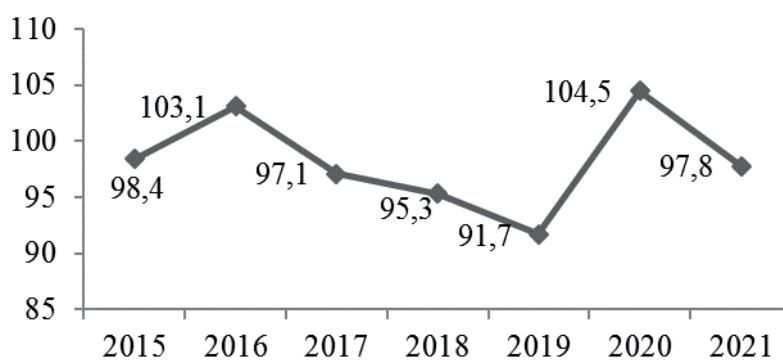


Fig. 2. Dynamics of the index of industrial products of Ukraine for the period 2015-2020, %\*  
\*Source: [25]

Table 1

Logistics efficiency index for the period 2014-2018\*

Indexes	2014	2016	2018	Absolute deviation			
				2016-2014		2018-2016	
LPI of the leading country	4.12	4.23	4.2	+0.11	↑	-0.03	↓
Including infrastructure of the leading country	4.32	4.44	4.24	+0.12	↑	-0.2	↓
LPI of Ukraine	2.98	2.74	2.83	-0.24	↓	+0.09	↑
Including infrastructure	2.65	2.49	2.22	-0.16	↓	-0.27	↓
Ukraine's place in the LPI rankings	61	80	66	+19	↓	-14	↑

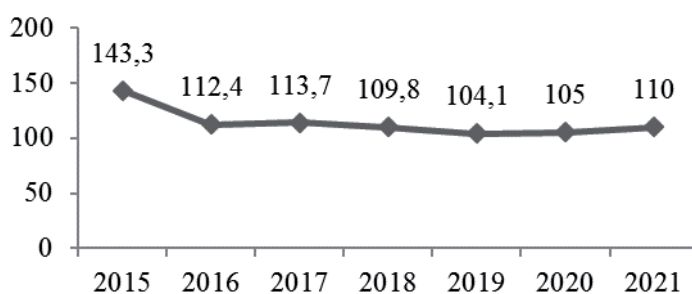
\*Source: Compiled by authors based on [26]

Table 2

**Dynamics of the average number of full-time employees at enterprises engaged in transport, warehousing, postal and courier activities\***

Indexes	2015	2016	2017	2018	2019	2020
Total number of people employed in the national economy, thousand people	16443.2	16276.9	16156.4	16360.9	16578.3	15915.3
Average number of full-time employees in transport, warehousing, postal and courier activities, thousand people	661.4	659.9	655.2	648.4	635.1	625.8
The specific weight of the average number of full-time employees employed in transport to the number employed in the national economy	0.04	0.041	0.041	0.040	0.038	0.039

\*Source: Compiled by authors based on [25]



**Fig. 3. Dynamics of the inflation index in Ukraine for the period 2015-2020, %\***

\*Source: Compiled by authors based on [27]

The outpacing growth of the world's leading transport sector can be viewed as a result of the increased use of the innovation component. Therefore, the fifth group of external factors includes innovation.

The most important and comprehensive index that characterizes innovativeness of the countries of the world in various fields is the Global Innovation Index. The maximum score according to this rating is 100 points. The leader country and the number of participating countries were changing during the analyzed period. The data of table 3 indicate a decrease in the innovation index in 2020 compared to the previous year both in Ukraine and in the leading country.

Based on the analysis of the above environmental factors that determine the efficiency of business processes of transport enterprises of Ukraine, the following indices were selected for the regression analysis:

1) the index of industrial production (in fractions of a unit);

2) the index of logistics efficiency (relative to the LPI of the leading country, in fractions of a unit).

3) the specific weight of the average number of full-time employees employed in transport in the number of employees in the national economy (in fractions of a unit);

4) the inflation index (in fractions of a unit);

5) the index of innovation (in fractions of a unit).

The resulting indicator is the growth of gross domestic product (by the production method) in the category "Transport, warehousing, postal and courier activities". The possibility of using this data is due to the fact that the bulk of GDP in this category is formed by transport companies, and warehousing, postal and courier activities are related activities. Table 4 contains the initial data for calculating the regression model of the dependence.

Table 3

## Global Innovation Index for the period 2015-2021\*

	2015	2016	2017	2018	2019	2020	2021	Absolute deviation for 2020 2021
Global innovation index of the leading country	68.30	66.28	67.69	68.4	67.24	66.08	65.5	-1.58 ↓
Global innovation index of Ukraine	36.45	35.72	37.62	38.52	37.4	36.32	35.6	-0.72 ↓
Total number of countries in the ranking	141	128	127	126	129	130	132	+2 ↓

\*Source: Compiled by authors based on [28; 29]

Table 4

## Initial data for calculating the regression model of the impact of external factors on GDP produced by transport enterprises

	Years					2020
	2015	2016	2017	2018	2019	
Growth of GDP of transport enterprises (Y)	1.338	1.161	1.220	1.189	1.165	0.991
Index of industrial production (X <sub>1</sub> )	0.984	1.031	0.971	0.953	0.917	1.045
Index of logistics efficiency (X <sub>2</sub> )	2.980	2.740	2.740	2.830	2.830	2.830
Specific weight of the average number of full-time employees employed in transport in the number of employees in the national economy (X <sub>3</sub> )	0.04	0.041	0.041	0.040	0.038	0.039
Inflation index (X <sub>4</sub> )	1.433	1.124	1.137	1.098	1.041	1.050
Index of innovation (X <sub>5</sub> )	0.365	0.357	0.376	0.385	0.374	0.363

Building a regression model in accordance with the system of equations (4) will involve solving a system of 6 equations with 6 unknowns. Then the system of equations will look like this:

$$\begin{aligned}
 6,091 &= a_0 \cdot 5,000 + a_1 \cdot 4,953 + a_2 \cdot 3,366 + a_3 \cdot 0,176 + a_4 \cdot 5,833 + a_5 \cdot 1,857, \\
 6,016 &= a_0 \cdot 4,953 + a_1 \cdot 4,924 + a_2 \cdot 3,327 + a_3 \cdot 0,174 + a_4 \cdot 5,742 + a_5 \cdot 1,840, \\
 4,108 &= a_0 \cdot 3,366 + a_1 \cdot 3,327 + a_2 \cdot 2,270 + a_3 \cdot 0,118 + a_4 \cdot 3,942 + a_5 \cdot 1,250, \\
 0,214 &= a_0 \cdot 0,176 + a_1 \cdot 0,174 + a_2 \cdot 0,118 + a_3 \cdot 0,006 + a_4 \cdot 0,204 + a_5 \cdot 0,065, \\
 7,147 &= a_0 \cdot 5,833 + a_1 \cdot 5,742 + a_2 \cdot 3,942 + a_3 \cdot 0,204 + a_4 \cdot 6,899 + a_5 \cdot 2,164, \\
 2,262 &= a_0 \cdot 1,857 + a_1 \cdot 1,840 + a_2 \cdot 1,250 + a_3 \cdot 0,065 + a_4 \cdot 2,164 + a_5 \cdot 0,690.
 \end{aligned} \tag{8}$$

As a result of solving this system of equations, a regression equation was obtained:

$$Y_{ex} = 1,703 + 1,818x_1 + 0,216x_2 - 0,257x_3 - 0,271x_4 + 0,639x_5. \tag{9}$$



Calculations show that the coefficient of determination is equal to 0.637, i.e. more than 0.5, so the model is statistically significant and can be used to analyze the impact of environmental factors on the efficiency of business processes at transport enterprises.

Thus, analyzing the regression model (9), one can conclude that the index of industrial production has the greatest impact on the growth of gross output of transport enterprises. This corresponds to the peculiarities of the operational activity of transport enterprises, whose products are services for the transportation of products of major sectors of the national economy. In the second place in terms of significance is the index of innovation, because innovation is now the driving force behind the development of enterprises in any industry. The influence of other factors (logistics efficiency, average number of employees and inflation) is almost the same. It should be noted that the impact of the average number of employees and the inflation index is reversed, i.e. with the growth of these factors, the gross output of transport enterprises will decrease.

Based on the results of the regression analysis, it can be argued that in order to strengthen the sustainability of transport enterprises in the context of European integration processes, management efforts should focus on creating flexible cluster-type organizational structures that can support innovation through joint business processes with partner companies. This will, on the one hand, maintain the level of efficiency of individual transport enterprises by deepening ties between enterprises in the cluster, and, on the other hand, get a synergy effect from joint business processes, which will be manifested in (1) balanced redistribution freight and passenger flows between transport enterprises included in the cluster; (2) improving the quality of transport services; (3) increasing the degree of production cooperation, which ensures the efficient use of the combined potential of network partners; (4) improving transport safety indicators; (5) increasing the efficiency of certain management functions through the division of labor, specialization, involvement of specialized organizations. As

a result of such measures, the efficiency of transport enterprises in both the short- and long-term perspective would be ensured.

The research showed that transport companies should develop and implement a strategy that would involve creation of joint business processes with related companies, both industrial and transport. This necessitates development and implementation of a logistics and outsourcing platform to bring together companies that share business processes to ensure their competitiveness in an unstable economy.

The positive experience of Western Europe shows that the development of logistics links and transport infrastructure can reduce overall logistics costs by almost 12-35%, transport costs – by 7-20%, the cost of loading and unloading and material flow – by 15-30%, as well as speed up the turnover of material resources by 20-40% and reduce their stocks by 50-200% [30].

Association of participants in the transportation process into a single system (that can provide quality logistics services to internal or external consumers while minimizing common logistics costs) requires coordination of interests between system contractors and creating necessary organizational prerequisites for managing transport and logistics process. The integration of interests, resource opportunities and business processes of different enterprises into a cooperating organization can be carried out on the basis of territorial, regional, product, functional, demographic and other types of community.

New generation of European regional policy programs proposes to use an approach based on regional innovation clusters. In relevant scientific studies, the term “cluster” is understood as an industrial complex, formed on the basis of territorial concentration of networks of specialized suppliers, major producers and consumers connected by a technological chain.

Currently, there are about 50 clusters in different regions and industries of Ukraine. The available information on the functioning of clusters convinces about the prospects of

their further development and formation in the regions.

The formation of transport and logistics clusters requires certain economic prerequisites. To assess regions of Ukraine from the point of view of economic preconditions for the creation of transport and logistics clusters, calculations were made by three indicators: the coefficient of localization (specialization), coefficients of "size" and "focus" of the cluster. Calculations are presented in table 5.

According to the calculation of the coefficient of specialization carried out in the

study for all regions of Ukraine and the city of Kyiv, it was determined that the formation of the cluster in the city of Kyiv, as well as Dnipropetrovsk and Odessa regions is potentially promising.

Clustering of transport and logistics enterprises and the functioning of clusters in Kyiv, Odessa and Dnipropetrovsk regions is also consistent with the provisions of the National Transport Strategy of Ukraine until 2030 [31].

One of the priority areas for improving the efficiency of transport and logistics services is the comprehensive provision

Table 5

**Calculation of the identification coefficients of enterprise clusters  
by regions of Ukraine, 2020\***

Region of Ukraine	Number of employed workers in transport, warehousing, postal and courier activities, thousand people	Average number of full-time employees by region, thousand people	«Focus» of the region	«Size» of the region	Specialization of the region
Ukraine	635.1	7443			
Vinnytska	24.4	257	0.095	0.038	0.450
Volynska	10.2	161	0.063	0.016	0.188
Dnipropetrovska	61.3	750	0.082	0.097	1.131
Donetska	34.7	360	0.096	0.055	0.640
Zhytomyrska	12.9	205	0.063	0.020	0.238
Zakarpatska	12.2	152	0.080	0.019	0.225
Zaporizka	23.2	351	0.066	0.037	0.428
Ivano-Frankivska	11.5	186	0.062	0.018	0.212
Kyivska	32.3	344	0.094	0.051	0.596
Kirovohradska	17.2	168	0.102	0.027	0.317
Luhanska	4.6	102	0.045	0.007	0.085
Lvivska	40.8	472	0.086	0.064	0.753
Mykolaivska	18.5	186	0.099	0.029	0.341
Odeska	67.4	412	0.164	0.106	1.244
Poltavska	26.1	293	0.089	0.041	0.482
Rivnenska	12.6	170	0.074	0.020	0.233
Sumska	16.8	193	0.087	0.026	0.310
Ternopil'ska	9.6	141	0.068	0.015	0.177
Kharkivska	44.3	546	0.081	0.070	0.817
Khersonska	11.9	148	0.080	0.019	0.220
Khmelnitska	11.4	200	0.057	0.018	0.210
Cherkaska	16.2	208	0.078	0.026	0.299
Chernivetska	6.4	110	0.058	0.010	0.118
Chernihivska	10.2	176	0.058	0.016	0.188
Kyiv city	98.1	1152	0.085	0.154	1.810

\* Source: calculated by the authors based on data of State Statistics Service of Ukraine

of transport and logistics services in the development of the transport and logistics system of the region and integration into the European space. It is economically more profitable if the whole range of logistics services is concentrated on one information platform.

The application of the logistics approach has a positive effect, first of all, on the sphere of circulation and concerns the processes of transportation and warehousing, which reduces the time of product movement, significantly reduces the number of cargo operations, vastly decreases transport costs and inventory levels. Therefore, it is advisable to initiate the creation of a cluster in order to create a single information space. The logistics and outsourcing platform can act as a tool for creating a cluster. It can be viewed as an integrated system of participants in the logistics chain, which consists (is modeled) of joint business processes and allows the use of such types of information and economic interaction as B2B, B2C, B2G.

The essence of logistics integration is to ensure strategic interaction and coherence between all participants in the process of creation, production, marketing and customer service

throughout its life cycle. The logistics and outsourcing platform should work closely with all members of the cluster, as well as solve problems of both tactical and strategic management and coordination. The improvement of the production and economic activities of enterprises occurs due to the rationalization of the management of logistics business processes.

When organizing a cluster on the basis of a logistics and outsourcing platform, the required product in the required quantity of proper quality is delivered to a specific customer at a specific time and place with minimal costs, provided the appropriate level of service. The logistics and outsourcing platform is a coordinating and integrating mechanism of management and transformation of material, information and other flows, which unites transport enterprises of a region and ensures high efficiency in fulfilling the goals of these enterprises. The constituent elements of the logistics outsourcing platform are shown in Fig. 4. The components of the platform will be able to ensure optimal coordination of all processes of maintenance of cargo flows with minimal costs and provision of an appropriate level of service.

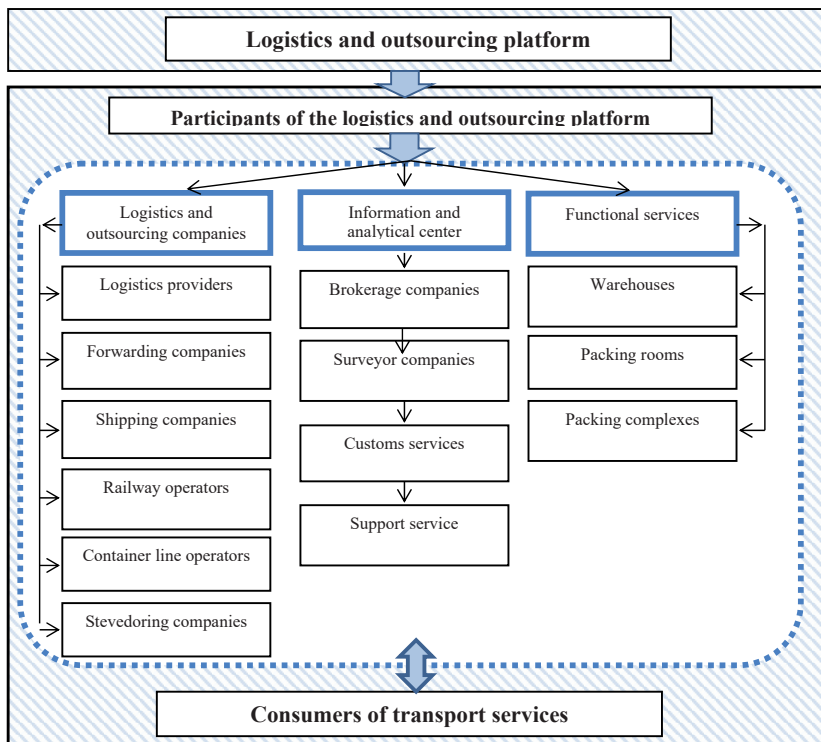


Fig. 4. The components of the logistics and outsourcing platform

With the availability of logistics and outsourcing platforms, all processes related to the management, maintenance, optimization of flows of various kinds will take place in a much shorter time, at a high-quality level. The costs of individual enterprises will be significantly reduced, and contributions to local and regional budgets will be significant.

The importance of the development of the region's infrastructure follows from such features of the cluster as geographical location and a wide range of participants. Developed infrastructure creates favorable opportunities for cluster development, which include: reduced transportation costs, increased speed and quality of order fulfillment, access to a full range of ancillary services (customs services, certification, consulting, packaging, labeling, optimization of business processes for relocation inventory through a single operator.

One of the characteristic features of the participation of business units in the cluster is their high specialization, which ensures a high level of quality of performance of their functions by each participant. As a result, there is a strong tendency towards outsourcing in clusters. Therefore, in this aspect, it would be reasonable to start the formation of a cluster with the construction of a logistics and outsourcing platform, which is entrusted with the whole range of functions for the formation of a transport and logistics system and its further management.

This will avoid duplication of operations and reduce the irrational use of resources, making it easier for participants to achieve common success.

The logistics and outsourcing platform should combine the functions of a transport and logistics center and an information and analysis center.

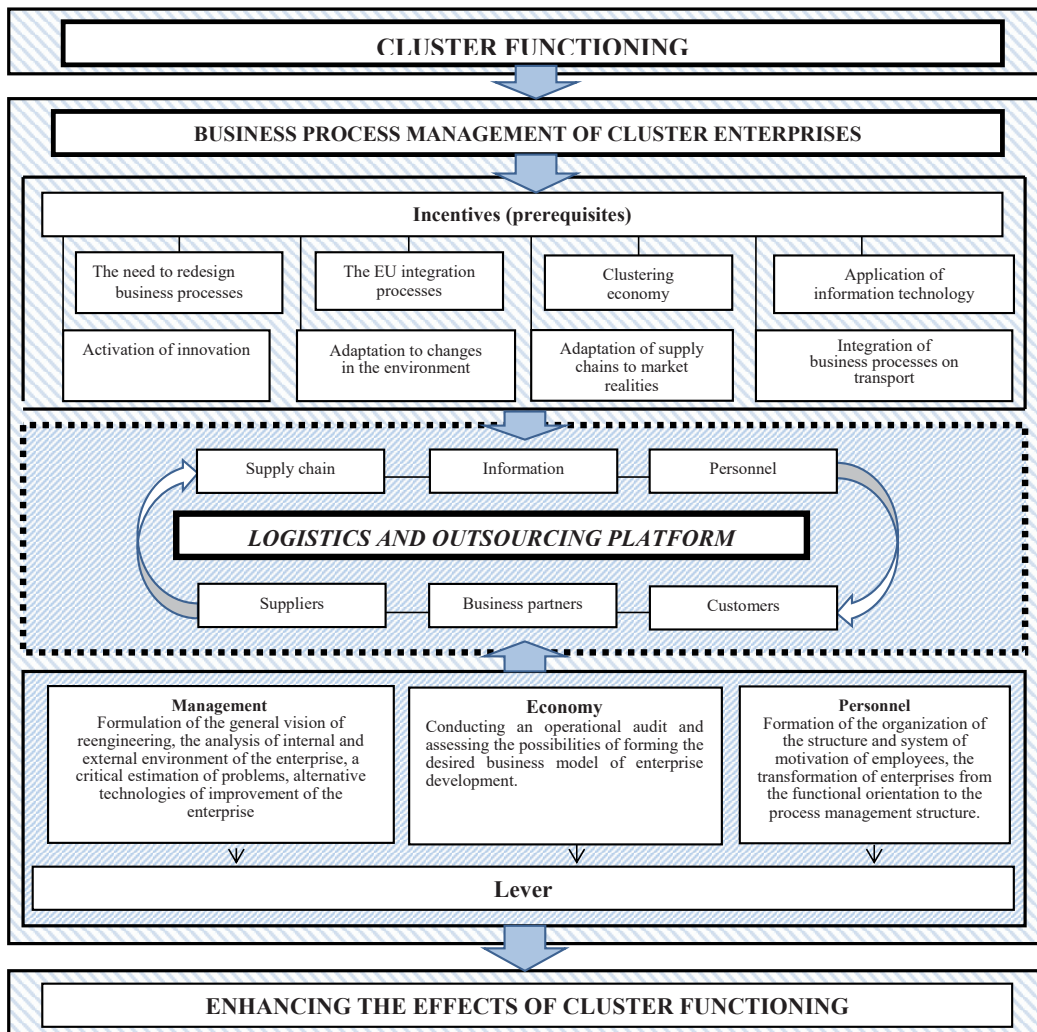
In order to ensure logistical coordination of incoming and outgoing business processes in the cluster, it is advisable to create a logistics and outsourcing platform in a single information space based on a process approach to the management of information and logistics technologies. The purpose of the platform is the uninterrupted movement of cargo flows according to the plan of formation and schedule of traffic to ensure the loading, timely and reliable delivery of goods to recipients in the right quantity, quality, on time and on logistical principles. The main joint business processes of the logistics and outsourcing platform, the management of which will help to obtain the effects of the cluster functioning, are shown in table 6.

The logistics and outsourcing platform should work closely with all members of the cluster, as well as solve problems of both tactical and strategic management and coordination. In addition, it should manage the business processes of cluster members in order to maximize the effects of cluster functioning (Fig. 5).

Table 6

**The main joint business processes of the logistics and outsourcing platform**

Business processes	Characteristics
Informational	Cargo flow control, creation of information resources, necessary for the formation of a cluster development strategy
Economic	Analysis, identification and making economically reasonable recommendations for reducing costs arising from transportation of shipment, through the use of resource-saving technologies, the rational use of the fixed assets of the cluster
Production and technical	organization of information support for making operational and strategic management decisions of the transportation process based on discovery visualization and analytical processing of data (Data Mining)
Financial	Getting more profit by attracting to the process of cargo transshipment and increase cluster competitiveness
Marketing	Promotion of cluster services on the domestic and world market
Managerial	Ensuring process controllability, strategic management
Intellectual	Staff development
Innovative	Implementation of the innovative technologies



**Fig. 5. Organizational and managerial mechanism of joint business processes of enterprises under the condition of functioning of the logistics and outsourcing platform**

The logistics and outsourcing platform must respond quickly to changing market conditions, using a set of methods and tools based on an engineering approach to management science by modeling, analyzing and redesigning key business processes, current and future tasks, covering many business functions of the transport and logistics system, including through the creation of new business process technologies.

**Conclusions**

To summarize, it should be noted that the formation of a transport and logistics cluster based on a logistics-outsourcing platform

is an effective approach to the innovative reorganization of business processes of a transport enterprise (taking into account the factors of the external environment and regional conditions of transport development in Ukraine).

Based on the assessment of the influence of external factors on the development of transport enterprises using correlation-regression analysis, it was established that the index of industrial production and the index of innovative activity have the greatest influence on the growth of the gross output of transport enterprises. Based on this, it was concluded that the main emphasis in

the reorganization of business processes should be placed on the formation of cluster structures of transport enterprises with a logistics platform. These structures are the most expedient for mobilizing internal innovation potential and forming sustainable interaction between both transport and logistics enterprises, as well as their networks (clusters), which include industrial and service enterprises. This is particularly significant in the context of the European integration of Ukraine during the war.

Calculations showed that according to the indicators of “specialization”, “size” and “direction”, such regions as Dnipropetrovsk (specialization index – 1.131), Odesa (specialization index – 1.244) oblasts and the city of Kyiv (specialization index – 1.244) have the most favorable economic prerequisites for the creation and development of transport and logistics clusters.

To ensure effective cooperation of the enterprises in the cluster, it was proposed to

form a logistics and outsourcing platform. It should consist of a complex of appropriate infrastructure and a set of companies specializing in storage, escort and delivery of goods and passengers, maintenance of infrastructure facilities and industrial enterprises, etc.

Further discussion and development require issues of allocation, quantitative and qualitative assessment of synergetic effects of the transport and logistics cluster, tools for effective regulation of joint business processes of logistics platform participants, coordination of their interests and distribution of benefit.

The use of research recommendations regarding the structure, functions and mechanisms of interaction of the participants of the transport and logistics platform of the cluster will ensure the effective functioning of the transport and logistics system of both individual transport companies and their regional networks (transport and logistics cluster) in the conditions of European integration during the war in Ukraine.

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## INNOVATIVE APPROACHES TO THE ORGANIZATION OF BUSINESS PROCESSES OF TRANSPORT ENTERPRISES IN THE CONTEX OF THE EUROPEAN INTEGRATION

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The simultaneous development of the European integration processes and military actions in Ukraine requires the justification of innovative approaches to the organization of business processes of transport companies to ensure their competitiveness in difficult conditions. The article substantiates directions and methods of innovative reorganization of business processes of a transport enterprise, taking into account external factors and regional characteristics.

The article uses the methods of regression modeling to determine the degree of influence of environmental factors on the activities of enterprises, as well as the methodology of the European Cluster Observatory regarding the feasibility of creating clusters.

It was established that the most influential factors of the external environment are the industrial production index (1.818) and the innovation index (0.639). To ensure the effective functioning of transport enterprises under the influence of these external factors, the feasibility of reorganizing their business processes by forming clusters with a logistics outsourcing platform is proposed and



substantiated. The article carried out a quantitative assessment of the regions of Ukraine and established that it is most expedient to form transport and logistics clusters in Dnipropetrovsk (specialization index – 1.131), Odesa (specialization index – 1.244) regions and the city of Kyiv (specialization index – 1.810). The article highlights the joint business processes of transport enterprises, on the basis of which it is most effective to design a logistics platform as an integrated system of interaction of participants in the logistics chain according to B2B, B2C, B2G schemes. Common business processes include such groups as informational, economic, technological, financial, marketing, intellectual, managerial, and innovative. The structural components of the logistics and outsourcing platform have been presented. They are logistics and outsourcing companies, information and analytical centers and functional services. The organizational and management mechanism of joint business processes of transport enterprises for the logistics platform has been developed.

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